COMPAQ

Maintenance and Service Guide

Compaq Evo Notebook N410c and N400c Series

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This guide is a troubleshooting reference used for maintaining and servicing the notebook. It provides comprehensive information on identifying notebook features, components, and spare parts, troubleshooting notebook problems, and performing notebook disassembly procedures.

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Product Description

The Compaq Evo Notebook N410c and N400c Series offer advanced modularity, 1.20-GHz, 1.00-GHz, 850-MHz, or 700-MHz Intel Pentium III processors with 64-bit architecture, industry-leading Accelerated Graphics Port (AGP) implementation, and extensive multimedia support. The notebook provides desktop functionality and connectivity through the optional Mobile Expansion Unit (MEU).

Figure 1-1. Compaq Evo Notebook N410c and Evo Notebook N400c

1.1 Models

Model naming conventions are shown in Tables 1-1 through 1-3.

Table 1-1
Compaq Evo Notebook N410c and N400c
Model Naming Conventions

Key									
N4c	P	120	X2	30	0	C	128	O	XXXXXX-XXX
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

Key	Description	Options	
1	Brand/Series designator	N = Evo Notebook	4 = Ultra portable c = Common
2	Processor type	P = Intel Pentium III	
3	Processor speed	120 = 1.20 GHz 100 = 1.00 GHz	850 = 850 MHz 700 = 700 MHz
4	Display type/ size/resolution	X = XGA (1024 × 768)	
5	Hard drive size	30 = 30.0 MB	20 = 20.0 MB
6	Optical drive designator	0 = None	
7	Integrated communication	M = Modem 0 = None	C = Modem/NIC combination card
8	RAM	25 = 256 MB 12 = 128 MB	0 = None
9	Operating system	E = Windows XP Home O = Windows XP Pro o = Windows XP/ Windows 2000 dual install	2 = Windows 2000 6 = Windows 2000/ Window NT 4.0 dual install 8 = Windows 98
10	SKU#		

Table 1-2
Compaq Evo Notebook N410c Models

The following Evo Notebook N410c models use config. code **KVB2** and features:

- TouchPad pointing device
- 4-cell, 2.0-Ah lithium ion (Li ion) battery pack
- 3-year warranty with on-site service
- 16 MB of integrated video memory

N410c	P	120	X2	30	0	C	25	O	
United States			470040-185						
N410c	P	120	X2	30	0	C	0	O	
United States			470040-184						
N410c	P	120	X2	30	0	C	25	2	
United States			470040-182						
N410c	P	120	X2	30	0	C	0	2	
United States			470040-183						

Table 1-2
Compaq Evo Notebook N410c Models *(Continued)*

The following Evo Notebook N410c models use config. code **KVBZ** and features:

- TouchPad pointing device
- 4-cell, 2.0-Ah Li ion battery pack
- 3-year warranty
- 16 MB of integrated video memory

N410c	P	120	X2	30	0	C	25	O	

Asia Pacific	470037-654	Latin America (NAFTA)	470037-597
Australia	470037-652		
Belgium	470037-564	The Netherlands	470037-629
Brazil	470037-651	Norway	470037-631
Czech Republic	470037-576	People's Republic of China	470037-655
Denmark	470037-582		
Europe International	470037-589		
France	470037-592	Portugal	470037-632
French Canada	470037-557	Russia	470037-634
Germany	470037-596	Saudi Arabia	470037-559
Greece/Poland	470037-599	Slovenia	470037-635
Hong Kong	470037-659	Spain	470037-637
Hungary	470037-624	Sweden	470037-638
Israel	470037-626	Switzerland	470037-640
Italy	470037-628	Taiwan	470037-657
Japan	470037-645	Turkey	470037-642
Japan (English)	470037-647	United Kingdom	470037-643
Korea	470037-660	United States	470037-550
Latin America	470037-649	United States (NAFTA)	470037-600

Table 1-2
Compaq Evo Notebook N410c Models *(Continued)*

N410c	P	120	X2	30	0	C	25	2	

Asia Pacific	470037-758	Latin America (NAFTA)	470037-574
Australia	470037-756		
Belgium	470037-716	The Netherlands	470037-732
Brazil	470037-753	Norway	470037-734
Czech Republic	470037-719	People's Republic of China	470037-759
Denmark	470037-721		
Europe International	470037-723		
France	470037-725	Portugal	470037-735
French Canada	470037-663	Russia	470037-737
Germany	470037-727	Saudi Arabia	470037-711
Greece/Poland	470037-728	Slovenia	470037-739
Hong Kong	470037-761	Spain	470037-740
Hungary	470037-729	Sweden	470037-742
Israel	470037-730	Switzerland	470037-745
Italy	470037-731	Taiwan	470037-760
Japan	470037-748	Turkey	470037-743
Japan (English)	470037-750	United Kingdom	470037-744
Korea	470037-762	United States	470037-662
Latin America	470037-751	United States (NAFTA)	470037-690

Table 1-2
Compaq Evo Notebook N410c Models *(Continued)*

N410c	P	100	X2	20	0	C	25	O	
Asia Pacific				470040-136		Latin America			470040-133
Australia				470040-135		The Netherlands			470040-121
Belgium				470040-044		Norway			470040-122
Brazil				470040-134		People's Republic of China			470040-137
Czech Republic				470040-057					
Denmark				470040-058					
Europe International				470040-114		Portugal			470040-123
France				470040-115		Russia			470040-124
French Canada				470040-006		Saudi Arabia			470040-020
Germany				470040-116		Slovenia			470040-125
Greece/Poland				470040-117		Spain			470040-126
Hong Kong				470040-139		Sweden			470040-127
Hungary				470040-118		Switzerland			470040-128
Israel				470040-119		Taiwan			470040-138
Italy				470040-120		Turkey			470040-129
Japan				470040-131		United Kingdom			470040-130
Japan (English)				470040-132		United States			470039-997
Korea				470040-140					

Table 1-2
Compaq Evo Notebook N410c Models *(Continued)*

N410c	P	100	X2	20	0	C	25	2	

Asia Pacific	470040-177	Latin America	470040-174
Australia	470040-176	The Netherlands	470040-160
Belgium	470040-150	Norway	470040-161
Brazil	470040-175	People's Republic of China	470040-178
Czech Republic	470040-151		
Denmark	470040-152		
Europe International	470040-153	Portugal	470040-162
France	470040-154	Russia	470040-163
French Canada	470040-149	Saudi Arabia	470040-164
Germany	470040-155	Slovenia	470040-165
Greece/Poland	470040-156	Spain	470040-166
Hong Kong	470040-180	Sweden	470040-167
Hungary	470040-157	Switzerland	470040-168
Israel	470040-158	Taiwan	470040-179
Italy	470040-159	Turkey	470040-169
Japan	470040-171	United Kingdom	470040-170
Japan (English)	470040-172	United States	470040-148
Korea	470040-181		

Table 1-2
Compaq Evo Notebook N410c Models *(Continued)*

The following Evo Notebook N410c models use config. code **KVBZ** and features:

- TouchPad pointing device
- 4-cell, 2.0-Ah Li ion battery pack
- 1-year warranty
- 16 MB of integrated video memory

N410c	P	120	X2	30	0	C	25	O	
Hong Kong				470037-594					
N410c	P	120	X2	30	0	C	25	2	
Hong Kong				470037-565					

The following Evo Notebook N410c models use config. code **KVB1** and features:

- TouchPad pointing device
- 4-cell, 2.0-Ah Li ion battery pack
- 1-year warranty
- 16 MB of integrated video memory

N410c	P	100	X2	30	0	C	25	O	
Japan				470037-593					
N410c	P	100	X2	30	0	C	12	2	
Japan				470037-534					

Table 1-3
Compaq Evo Notebook N400c Models

The following Evo Notebook N400c models use config. code **JMWZ** and features:

- TouchPad pointing device
- 4-cell, 2.0-Ah Li ion battery pack
- 1-year warranty with on-site service
- 16 MB of integrated video memory

N400c	P	850	X2	20	0	0	25	6	
European International				470026-527		Thailand			470026-528

N400c	P	850	X2	20	0	C	25	6	
Australia				470026-698		Norway			470031-229
Belgium				470031-219		People's Republic of China			470031-237
Brazil				470031-236					
Czech Republic				470031-220					
Denmark				470031-221		Portugal			470031-231
France				470026-534		Russia			470031-232
French Canada				470026-533		Saudi Arabia			470031-226
Germany				470026-535		Slovakia/ Slovenia			470031-233
Greece/Poland				470031-223					
Hong Kong				470031-239		Spain			470031-410
Hungary				470031-224		Sweden			470031-234
Israel				470031-225		Switzerland			470026-749 and 470026-750
Italy				470026-536					
Japan				470026-693					
Japan English				470026-694		Taiwan			470031-238
Korea				470031-240		Thailand			470026-697
Latin America				470026-695		Turkey			470031-235
Latin America (NAFTA)				470026-532		United Kingdom			470026-537
						United States			470026-529
The Netherlands				470031-228		United States (NAFTA)			470026-531

Table 1-3
Compaq Evo Notebook N400c Models *(Continued)*

N400c	P	700	X2	20	0	C	12	6	
Asia Pacific				470013-784		Norway			470013-742
Australia				470013-786		People's Republic of China			470013-788
Belgium				470013-762					
Brazil				470013-782					
Czech Republic				470013-763		Portugal			470013-746
Denmark				470013-764		Russia			470013-752
France				470013-765		Saudi Arabia			470013-733
French Canada				470013-761		Slovakia/ Slovenia			470013-756
Germany				470013-766					
Greece/Poland				470013-767		Spain			470013-758
Hong Kong				470013-792		Sweden/Finland			470013-760
Hungary				470013-768		Switzerland			470013-769 and 470013-770
Israel				470013-717					
Italy				470013-721					
Japan				470013-776		Taiwan			470013-790
Japan English				470013-778		Turkey			470013-772
Korea				470013-794		United Kingdom			470013-774
Latin America				470013-780		United States			470013-471
Latin America (NAFTA)				470013-690		United States (NAFTA)			470013-689
The Netherlands				470013-738					

Table 1-3
Compaq Evo Notebook N400c Models *(Continued)*

N400c	P	700	X2	20	0	C	12	8	
Asia Pacific				470013-783		The Netherlands			470013-736
Australia				470013-785		Norway			470013-740
Belgium				470013-695		People's Republic of China			470013-787
Brazil				470013-781					
Czech Republic				470013-696					
Denmark				470013-697		Portugal			470013-744
France				470013-698		Russia			470013-750
French Canada				470013-694		Saudi Arabia			470013-732
Germany				470013-699		Slovakia/ Slovenia			470013-755
Greece/Poland				470013-711					
Hong Kong				470013-791		Spain			470013-757
Hungary				470013-715		Sweden/Finland			470013-759
Israel				470013-716		Taiwan			470013-789
Italy				470013-720		Turkey			470013-771
Japan				470013-775		United Kingdom			470013-773
Japan English				470013-777		United States			470013-470
Korea				470013-793		United States (NAFTA)			470013-683
Latin America				470013-779					
Latin America (NAFTA)				470013-686					
N400c	P	700	X2	20	0	0	12	6	
European International				470013-678		Asia Pacific			470013-679
N400c	P	700	X2	20	0	0	12	8	
European International				470013-676		Asia Pacific			470013-677

1.2 Features

The notebook has the following features:

- Intel Pentium III 1.20-GHz, 1.00-GHz, 850-MHz, or 700-MHz processor, with 256-KB integrated cache, varying by notebook model
- ATI Mobility M1, 8-MB SDRAM
- 128 MB standard memory, expandable to 512 MB
- Microsoft Windows 98, Windows 2000, Windows NT, or Windows XP preinstalled, varying by notebook model
- 12.1-inch, XGA, TFT (1024 × 768) or 12.1-inch, SVGA, TFT (800 × 600) display, with over 16.8 million colors, varying by notebook model
- TouchPad or pointing stick pointing device (pointing stick available only on Evo Notebook N400c models)
- Mini PCI 56K V.90 modem, or optional Mini PCI V.90 modem plus 10/100 NIC combination card
- Support for one Type II PC Card slot with support for both 32-bit CardBus and 16-bit PC Cards
- External AC adapter with power cord
- Supports a 4-cell Li ion primary battery pack in the battery bay and an external 4-cell Li ion or 9-cell high-capacity battery pack
- 40-, 30-, 20-, or 10-GB high-capacity hard drive
- Connectors for Mobile Expansion Unit (MEU), MultiPort wireless communication devices, stereo speaker/headphone, microphone, universal serial bus (USB), RJ-45 network, RJ-11 modem, parallel, serial, video out, external monitor, and AC power
- Speaker

1.2 Clearing a Password

If the notebook you are servicing has an unknown password, follow these steps to clear the password. These steps also clear CMOS.

1. Prepare the notebook for disassembly. Refer to Section 5.3, “Preparing the Computer for Disassembly,” for more information.
2. Remove the real time clock (RTC) battery (refer to Section 5.10, “Real Time Clock (RTC) Battery”).
3. Wait approximately five minutes.
4. Replace the RTC battery and reassemble the notebook.
5. Connect AC power to the notebook. Do **not** reinsert any battery packs at this time.
6. Turn on the notebook.

All passwords and all CMOS settings are clear.

1.3 Power Management

The notebook comes with a collection of power management features that extends battery operating time and conserves power. The notebook supports the following power management features:

- Standby
- Hibernation
- Setting customized by the user
- Hotkeys for setting level of performance
- Smart battery that provides an accurate battery power gauge
- Battery calibration
- Lid switch suspend/resume
- Power switch
- Standby button
- Advanced Configuration and Power Management (ACP) compliant

1.3 Computer External Components

The external components on the display and left side of the notebook are shown in Figure 1-2 and described in Table 1-4.

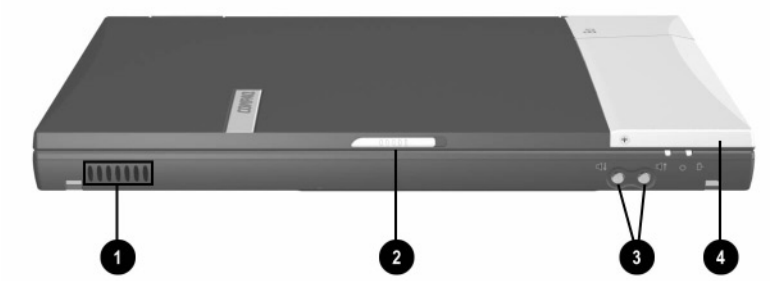


Figure 1-2. Front Panel Components

Table 1-4
Front Panel Components

Item	Component	Function
1	Vent	Allows airflow to cool internal components.
2	Display release latch	Releases the display to open the notebook.
3	Volume buttons (2)	Adjust or mute the system volume.
4	MultiPort	Connects wireless communication devices, such as a Bluetooth or 802.11b MultiPort Module, and other options.

The external components on the right side of the notebook are shown in Figure 1-3 and described in Table 1-5.

Figure 1-3. Right Side Components

Table 1-5
Right Side Components

Item	Component	Function
1	Power switch	Turns the notebook on or off or exits Standby.
2	Stereo speaker/ headphone jack	Connects stereo speakers, headphones, headset, or television audio.

Table 1-5
Right Side Components *(Continued)*

Item	Component	Function
3	Microphone jack	Connects a single sound channel microphone.
4	PC Card eject button	Ejects a PC Card from the PC Card slot.
5	PC Card slot	Supports 32-bit (CardBus) and 16-bit PC Cards.
6	USB connector	Connects USB devices.
7	Infrared port	Links another IrDA-compliant device for wireless communication.
8	RJ-45 jack (network models only)	Connects the network cable. A network cable is included with network models.
9	RJ-11 jack (internal modem models only)	Connects the modem cable to an internal modem. A modem cable is included with internal modem models.

The external components on the left side of the notebook are shown in Figure 1-4 and described in Table 1-6.

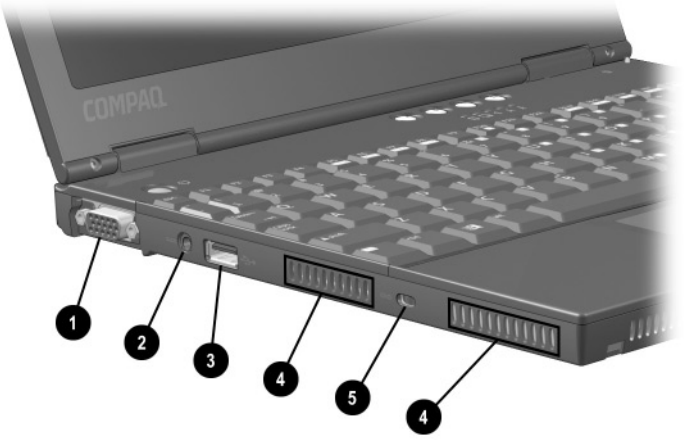


Figure 1-4. Left Side Components

Table 1-6
Left Side Components

Item	Component	Function
1	External monitor connector	Connects an external monitor or overhead projector.
2	Power jack	Connects any one of the following: ■ AC adapter ■ Optional automobile power adapter/charger ■ Optional aircraft power adapter
3	USB connector	Connects USB devices.
4	Vents	Allow airflow to cool internal components. The forward vent is present only on Evo Notebook 400c models.
5	Security cable slot	Attaches an optional security cable to the notebook.

Computer keyboard components are shown in Figure 1-5 and described in Table 1-7.

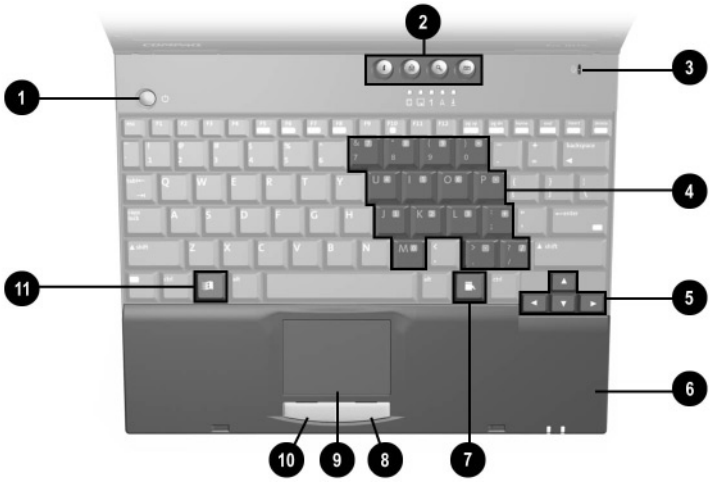


Figure 1-5. Keyboard Components (TouchPad Model)

Table 1-7
Keyboard Components

Item	Component	Function
1	Power/Standby button	■ Turns on the notebook if it is off. ■ Initiates and exits Standby. ■ When pressed with the **Fn** key, initiates Hibernation.
2	Easy Access buttons (4)	Provide quick access to the Internet.

Table 1-7
Keyboard Components *(Continued)*

Item	Component	Function
3	Microphone	Inputs single-channel sound to the notebook; can be used whether the notebook is open or closed.
4	Embedded numeric keypad	Converts keys to numeric keypad.
5	Cursor control keys	Move the cursor around the screen.
6	Palm rest	Provides TouchPad and TouchPad buttons or the pointing stick buttons. Also protects the internal hard drive, internal memory expansion slot, and modem/NIC mini PCI slot connector.
7	Windows application key	Displays a menu when using a Microsoft application. The menu is the same one that is displayed by pressing the right mouse button.
8	Right TouchPad button (TouchPad models only)	Functions like the right mouse button on an external mouse.
9	TouchPad (TouchPad models only)	Moves the mouse cursor, selects, and activates.
10	Left TouchPad button (TouchPad models only)	Functions like the left mouse button on an external mouse.
11	Windows logo key	Displays Windows Start menu.
12	Caps lock key	Turns on the caps lock function.

Computer top components are shown in Figure 1-6 and described in Table 1-8.

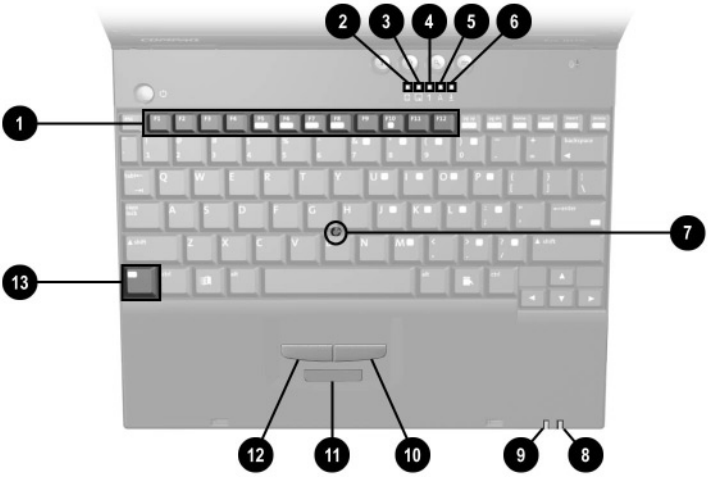


Figure 1-6. Keyboard Components (Pointing Stick Model—Evo Notebook N400c models only)

Table 1-8
Keyboard Components

Item	Component	Function
1	**F1** through **F12** function keys	Perform preset functions.
2	Hard drive light	On: The primary hard drive is being accessed.
3	MultiBay light	On: A MultiBay drive in the optional MEU or an external diskette drive connected to the notebook is being accessed.

Table 1-8
Keyboard Components *(Continued)*

Item	Component	Function
4	Num lock light	On: Num lock is on and the embedded numeric keypad is enabled.
5	Caps lock light	On: Caps lock is on.
6	Scroll lock light	On: Scroll lock is on.
7	Battery light	On: A battery pack is charging. Blinking: A battery pack that is the only available power source has reached a low-battery condition.
8	Power light	On: Power is turned on. Blinking: Computer is in Standby. The power light also blinks if a battery pack that is the only available power source reaches a critical low-battery condition while Hibernation is disabled.
9	Pointing stick	Moves the mouse cursor.
10	Right pointing stick button	Functions like the right mouse button on an external mouse.
11	Scroll button	Can be set to scroll, magnify, or function like the third button on an external mouse.
12	Left pointing stick button	Functions like the left mouse button on an external mouse.
13	**Fn** key	Used with hotkeys to perform preset hotkey functions.

The external components on the bottom of the notebook are shown in Figure 1-7 and described in Table 1-9.

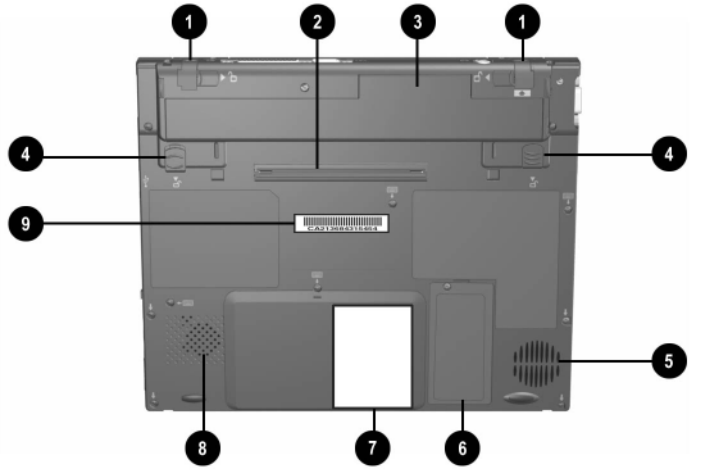


Figure 1-7. Bottom Components

Table 1-9
Bottom Components

Item	Component	Function
1	External battery release latches (2)	Release the external battery pack.
2	Docking connector	Connects the notebook to an optional Mobile Expansion Unit.
3	Battery bay	Holds the primary battery pack.
4	Primary battery release latches (2)	Release the primary battery pack from the battery bay.
5	Fan	Provides airflow to cool internal components.
6	Memory expansion compartment cover	Covers the memory expansion compartment that contains one memory expansion slot for a memory expansion board.
7	Certificate of Authenticity label	Contains the Product Key, which may need to be entered before using some Windows operating systems.
8	Speaker	Produces sound.
9	Serial number	Identifies the notebook; needed when you call Compaq customer support.

The notebook rear panel components are shown in Figure 1-8 and described in Table 1-10.

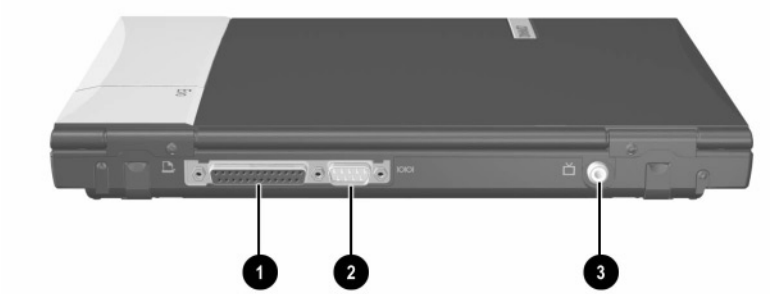


Figure 1-8. Rear Panel Components

Table 1-10
Rear Panel Components

Item	Component	Function
1	Parallel connector	Connects a parallel device.
2	Serial connector	Connects a serial device.
3	Composite TV connector	Connects a television, VCR, camcorder, overhead projector, or video capture card.

1.4 Design Overview

This section presents a design overview of key parts and features of the notebook. Refer to Chapter 3, “Illustrated Parts Catalog,” to identify replacement parts, and Chapter 5, “Removal and Replacement Procedures,” for disassembly steps.

The system board provides the following device connections:

- Memory expansion board
- Hard drive
- Display
- Keyboard/TouchPad or pointing stick
- Audio
- Intel Pentium III processor
- Fan
- PC Card
- Modem or modem/NIC

The notebook uses an electrical fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the right side of the notebook.

CAUTION: To properly ventilate the notebook, allow at least a 7.6-cm. (3-inch) clearance on the left side of the notebook.

2

Troubleshooting

WARNING: Only authorized technicians trained by Compaq should repair this equipment. All troubleshooting and repair procedures are detailed to allow only subassembly/module level repair. Because of the complexity of the individual boards and subassemblies, no one should attempt to make repairs at the component level or make modifications to any printed wiring board. Improper repairs can create a safety hazard. Any indication of component replacement or printed wiring board modification may void any warranty or exchange allowances.

2.1 Computer Setup and Diagnostics Utilities

Selecting Computer Setup or Compaq Diagnostics

The notebook features two Compaq system management utilities:

- **Computer Setup**—A system information and customization utility that can be used even when your operating system is not working or will not load. This utility includes settings that are not available in Windows.

- **Compaq Diagnostics**—A system information and diagnostic utility that is used within your Windows operating system. Use this utility whenever possible to:
  - ❏ Display system information.
  - ❏ Test system components.
  - ❏ Troubleshoot a device configuration problem in Windows 2000, Windows XP Professional, or Windows XP Home.

Using Computer Setup

Information and settings in Computer Setup are accessed from the File, Security, or Advanced menus:

1. Turn on or restart the notebook. Press **F10** while the F10 = ROM Based Setup message is displayed in the lower-left corner of the screen.
   - ❏ To change the language, press **F2.**
   - ❏ To view navigation information, press **F1.**
   - ❏ To return to the Computer Setup menu, press **esc.**
2. Select the File, Security, or Advanced menu.
3. To close Computer Setup and restart the notebook:
   - ❏ Select File > Save Changes and Exit and press **enter.**

   or
   - ❏ Select File > Ignore Changes and Exit and press **enter.**
4. When you are prompted to confirm your action, press **F10.**

Selecting from the File Menu

Table 2-1
File Menu

Select	To Do This
System Information	■ View identification information about the notebook, a docking base, and any battery packs in the system. ■ View specification information about the processor, memory and cache size, and system ROM.
Save to Floppy	Save system configuration settings to a diskette.
Restore from Floppy	Restore system configuration settings from a diskette.
Restore Defaults	Replace configuration settings in Computer Setup with factory default settings. (Identification information is retained.)
Ignore Changes and Exit	Cancel changes entered during the current session, then exit and restart the notebook.
Save Changes and Exit	Save changes entered during the current session, then exit and restart the notebook.

Selecting from the Security Menu

Table 2-2
Security Menu

Select	To Do This
Setup Password	Enter, change, or delete a setup password. (The setup password is called an administrator password in Compaq Computer Security, a program accessed from the Windows Control Panel.)
Power-on Password	Enter, change, or delete a power-on password.
DriveLock Passwords	Enable/disable DriveLock; change a DriveLock User or Master password. ✎ Drive Lock Settings are accessible only when you enter Computer Setup by turning on (not restarting) the notebook.
Password Options Password options can be selected only when a power-on password has been set.	Enable/disable: ■ QuickLock ■ QuickLock on Standby ■ QuickBlank ✎ To enable QuickLock on Standby or QuickBlank, you must first enable QuickLock.
Device Security	Enable/disable: ■ Ports or diskette drives* ■ Diskette write* ■ CD-ROM or diskette startup ✎ Settings for a DVD-ROM can be entered in the CD-ROM field.
System IDs	Enter identification numbers for the notebook, a docking base, and all battery packs in the system.

*Not applicable to SuperDisk LS-120 drives.

Selecting from the Advanced Menu

Table 2-3
Advanced Menu

Select	To Do This
Language (or press **F2**)	Change the Computer Setup language.
Boot Options	Enable/disable: ■ QuickBoot, which starts the notebook more quickly by eliminating some startup tests. (If you suspect a memory failure and want to test memory automatically during startup, disable QuickBoot.) ■ MultiBoot, which sets a startup sequence that can include most bootable devices and media in the system.
Device Options	■ Enable/disable the embedded numeric keypad at startup. ■ Enable/disable multiple standard pointing devices at startup. (To set the notebook to support only a single, usually nonstandard, pointing device at startup, select Disable.) ■ Enable/disable USB legacy support for a USB keyboard. (When USB legacy support is enabled, the keyboard works even when a Windows operating system is not loaded.) ■ Set an optional external monitor or overhead projector connected to a video card in a docking base as the primary device. (When the notebook display is set as secondary, the notebook must be shut down before undocking from a docking base.)

Table 2-3
Advanced Menu *(Continued)*

Select	To Do This
Device Options *(continued)*	■ Change the parallel port mode from Enhanced Parallel Port (EPP, the default setting) to standard, bidirectional, EPP or Enhanced Capabilities Port (ECP). ■ Set video-out mode to NTSC (default), PAL, NTSC-J, or PAL-M.* ■ Enable/disable all settings in the SpeedStep window. (When Disable is selected, the notebook runs in Battery Optimized mode.) ■ Specify how the notebook recognizes multiple identical docking bases that are identically equipped. (Select Disable to recognize the docking bases as a single docking base; select Enable to recognize the docking bases individually, by serial number.) ■ Enable/disable the reporting of the processor serial number by the processor to the software.
HDD Self Test Options	Run a quick comprehensive self test on hard drives in the system that support the test features.

* Video modes vary even within regions. However, NTSC is common in North America; PAL, in Europe, Africa, and the Middle East; NTSC-J, in Japan; and PAL-M, in Brazil. Other South and Central American regions may use NTSC, PAL, or PAL-M.

2.2 Using Compaq Diagnostics

When you access Compaq Diagnostics, a scan of all system components is displayed on the screen before the Compaq Diagnostics window opens.

You can display more or less information from anywhere within Compaq Diagnostics by selecting Level on the menu bar.

Compaq Diagnostics is designed to test Compaq components. If non-Compaq components are tested, the results may be inconclusive.

Obtaining, Saving, or Printing Configuration Information

1. Access Compaq Diagnostics by selecting Start > Settings > Control Panel > Compaq Diagnostics.
2. Select Categories, then select a category from the drop-down list.
   - ❏ To save the information, select File > Save As.
   - ❏ To print the information, select File > Print.
3. To close Compaq Diagnostics, select File > Exit.

Obtaining, Saving, or Printing Diagnostic Test Information

1. Access Compaq Diagnostics by selecting Start > Settings > Control Panel > Compaq Diagnostics.
2. Select the Test tab.
3. In the scroll box, select the category or device you want to test.
4. Select a test type:
   - **Quick Test**—Runs a quick, general test on each device in a selected category.
   - **Complete Test**—Performs maximum testing on each device in a selected category.
   - **Custom Test**—Performs maximum testing on a selected device.
     - To run all tests for your selected device, click Check All.
     - To run only the tests you select, click Uncheck All, then select the checkbox for each test you want to run.

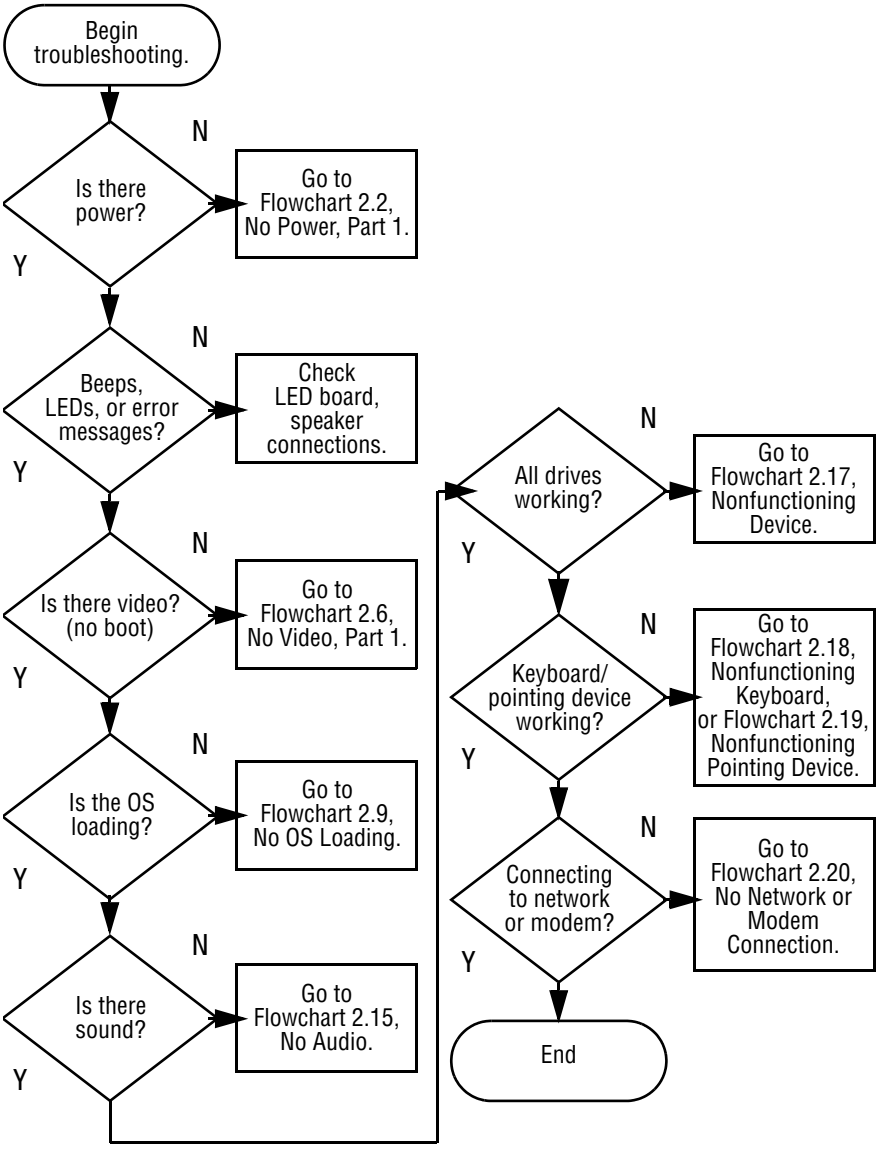
5. Select a test mode:
   - ❏ **Interactive Mode**—Provides maximum control over the testing process. You determine whether the test was passed or failed, and you may be prompted to insert or remove devices.
   - ❏ **Unattended Mode**—Does not display prompts. If errors are found, they are displayed when testing is complete.
6. Click Begin Testing.
7. Select a tab to view a test report:
   - ❏ **Status tab**—Summarizes the tests run, passed, and failed during the current testing session.
   - ❏ **Log tab**—Lists tests run on the system, the number of times each test has run, the number of errors found on each test, and the total run time of each test.
   - ❏ **Error tab**—Lists all errors found in the notebook with their error codes.
8. Select a tab to save the report:
   - ❏ **Log tab**—Select Save.
   - ❏ **Error tab**—Select Save.
9. Select a tab to print the report:
   - ❏ **Log tab**—Select File > Save As, then print the file from your folder.

2.3 Troubleshooting Flowcharts

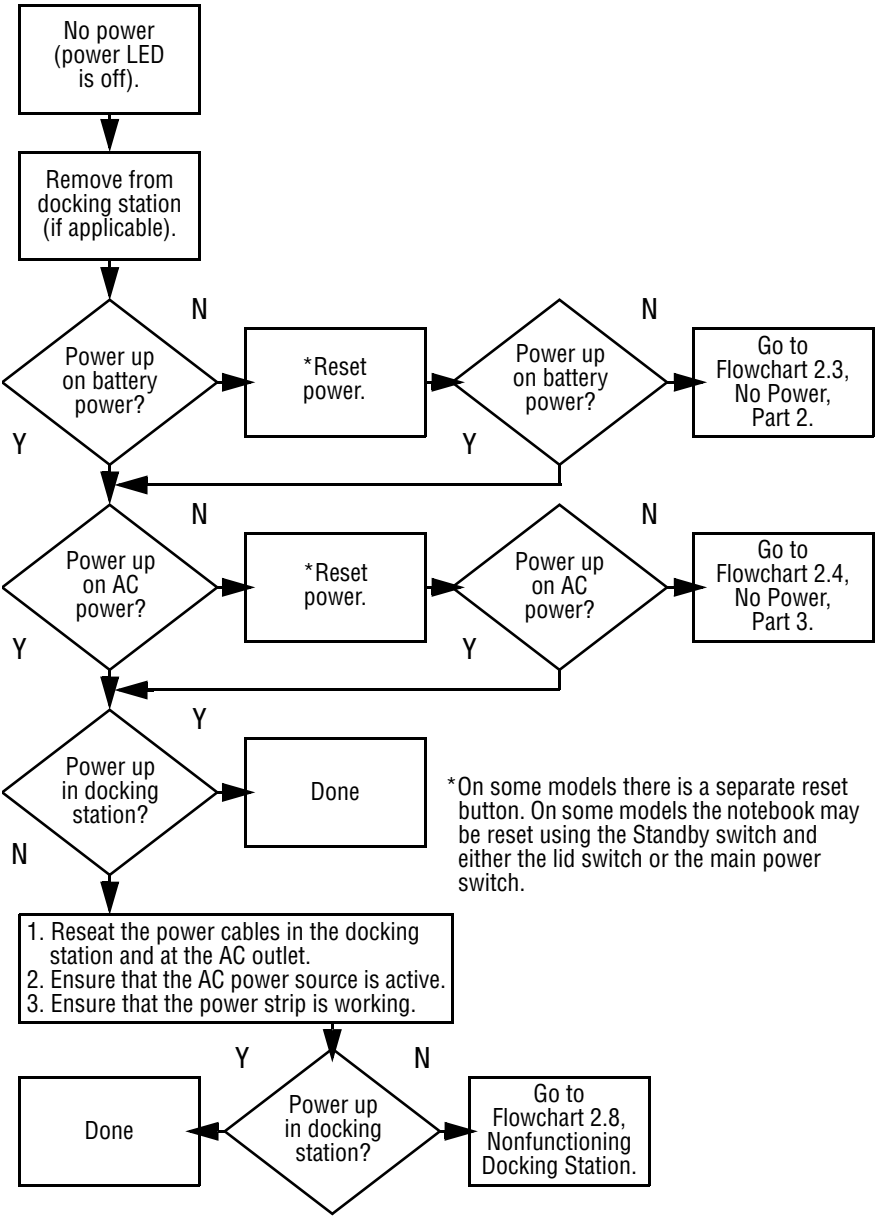
Table 2-4
Troubleshooting Flowcharts Overview

Flowchart	Description
2.1	Initial Troubleshooting
2.2	No Power, Part 1
2.3	No Power, Part 2
2.4	No Power, Part 3
2.5	No Power, Part 4
2.6	No Video, Part 1
2.7	No Video, Part 2
2.8	Nonfunctioning Docking Station
2.9	No Operating System (OS) Loading
2.10	No OS Loading From Hard Drive, Part 1
2.11	No OS Loading From Hard Drive, Part 2
2.12	No OS Loading From Hard Drive, Part 3
2.13	No OS Loading From Diskette Drive
2.14	No OS Loading From CD- or DVD-ROM Drive
2.15	No Audio, Part 1
2.16	No Audio, Part 2
2.17	Nonfunctioning Device
2.18	Nonfunctioning Keyboard
2.19	Nonfunctioning Pointing Device
2.20	No Network or Modem Connection

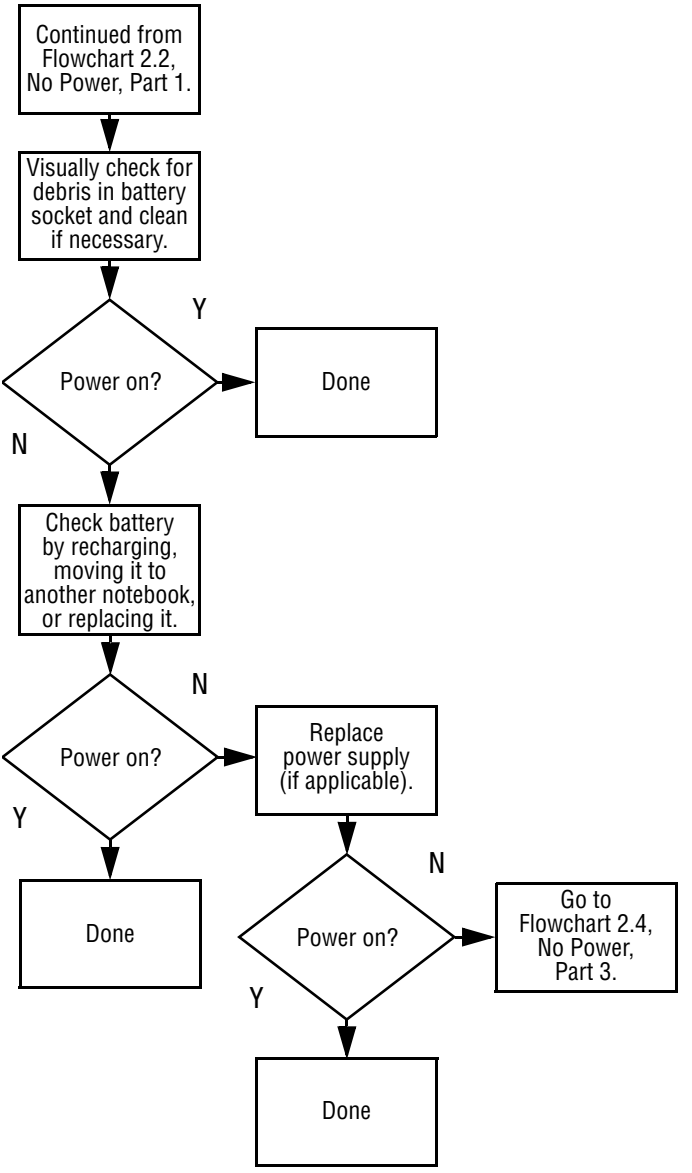
Flowchart 2.1 - Initial Troubleshooting



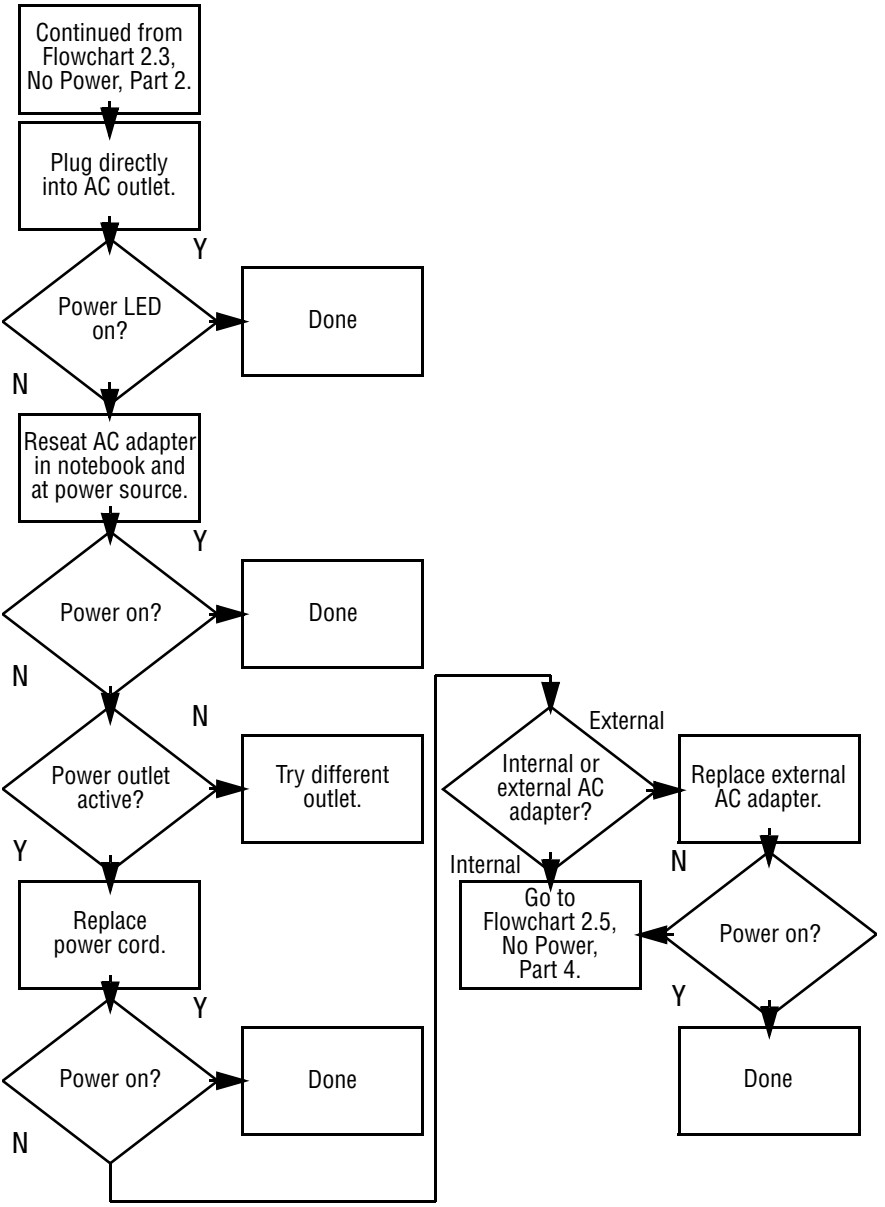
Flowchart 2.2 - No Power, Part 1


No power (power LED is off).
Remove from docking station (if applicable).
Power up on battery power?
N
Y
*Reset power.
Power up on battery power?
N
Y
Go to Flowchart 2.3, No Power, Part 2.
Power up on AC power?
N
Y
*Reset power.
Power up on AC power?
N
Y
Go to Flowchart 2.4, No Power, Part 3.
Power up in docking station?
Y
N
Done
*On some models there is a separate reset button. On some models the notebook may be reset using the Standby switch and either the lid switch or the main power switch.
1. Reseat the power cables in the docking station and at the AC outlet.
2. Ensure that the AC power source is active.
3. Ensure that the power strip is working.
Power up in docking station?
Y
N
Done
Go to Flowchart 2.8, Nonfunctioning Docking Station.

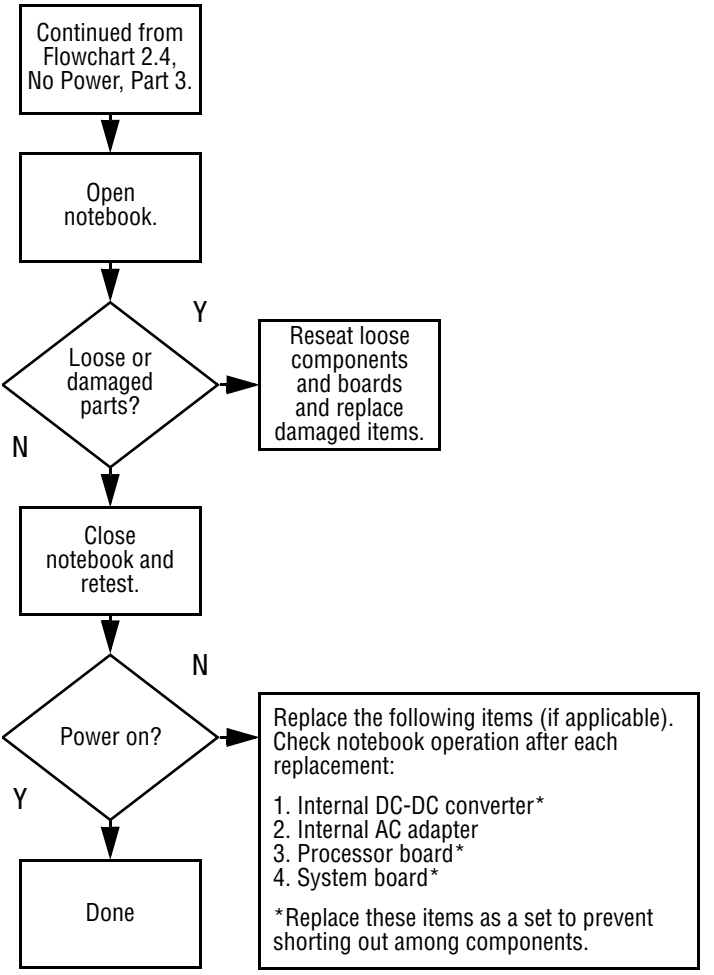
Flowchart 2.3 - No Power, Part 2



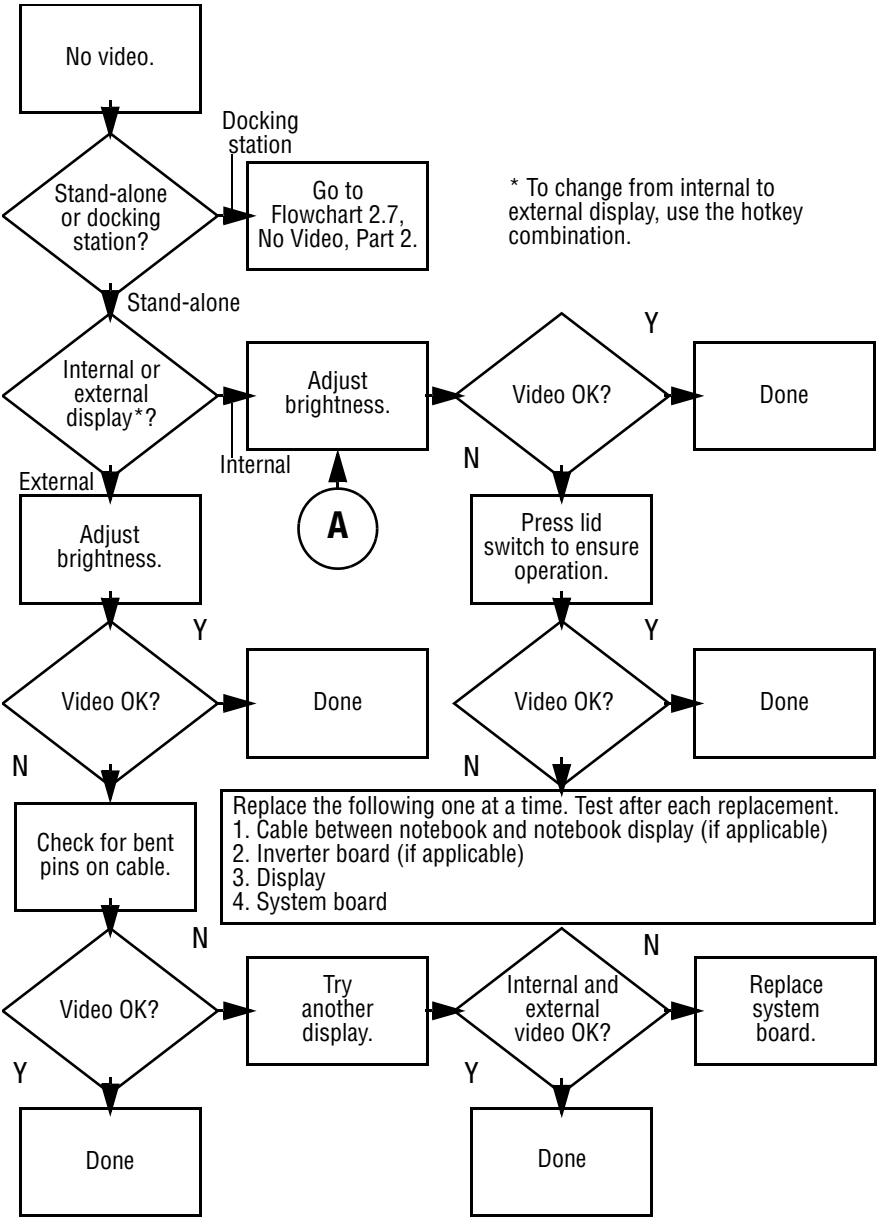
Flowchart 2.4 - No Power, Part 3



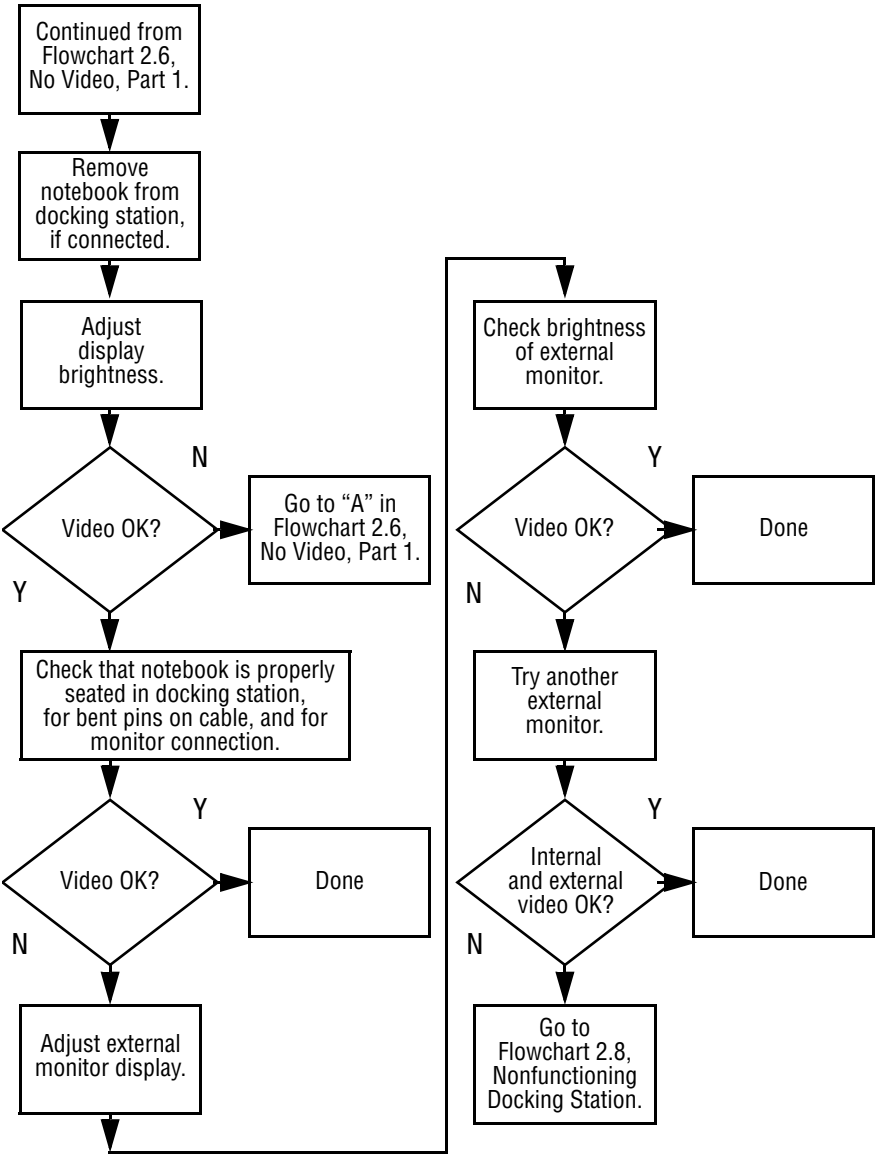
Flowchart 2.5 - No Power, Part 4


Continued from Flowchart 2.4, No Power, Part 3.
Open notebook.
Loose or damaged parts?
Y
N
Reseat loose components and boards and replace damaged items.
Close notebook and retest.
Power on?
N
Y
Done
Replace the following items (if applicable). Check notebook operation after each replacement:
1. Internal DC-DC converter*
2. Internal AC adapter
3. Processor board*
4. System board*
*Replace these items as a set to prevent shorting out among components.

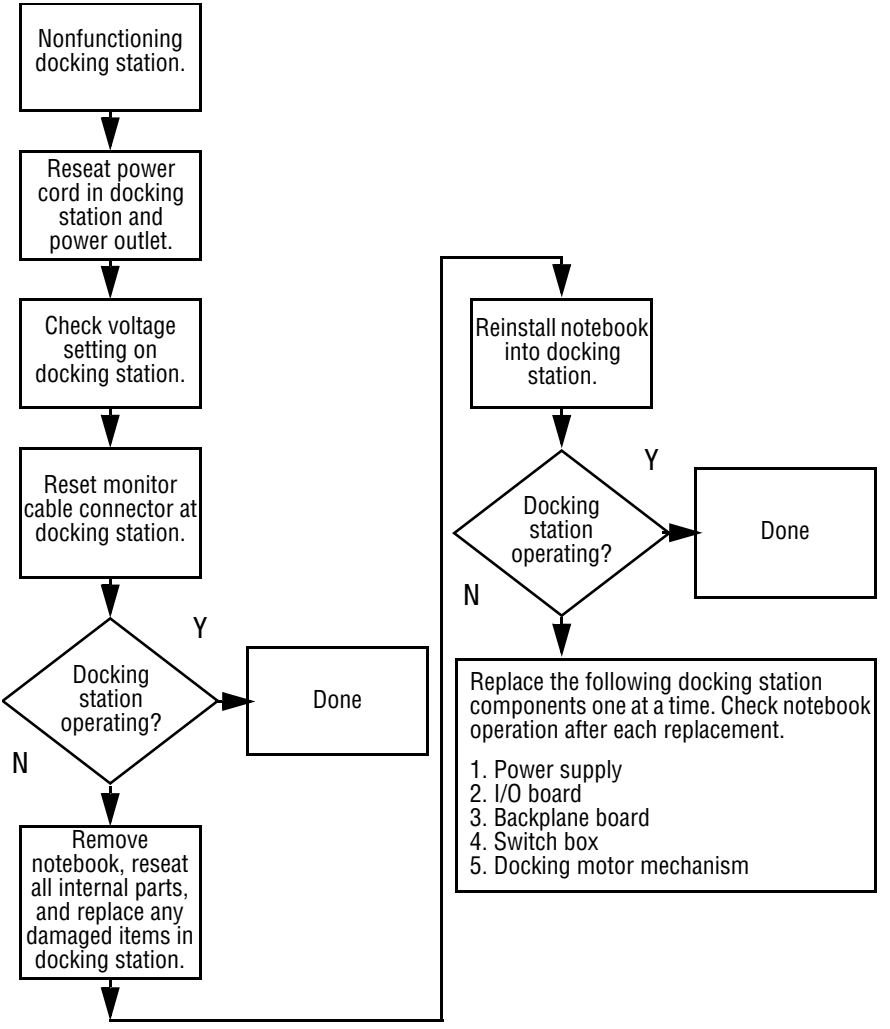
Flowchart 2.6 - No Video, Part 1



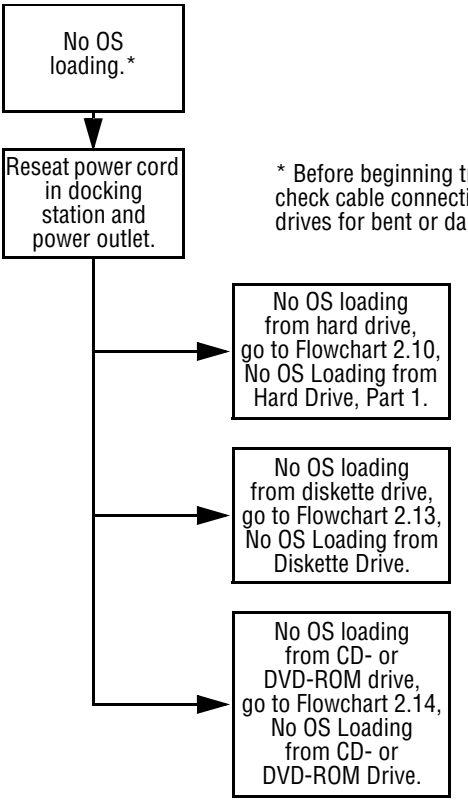
Flowchart 2.7 - No Video, Part 2



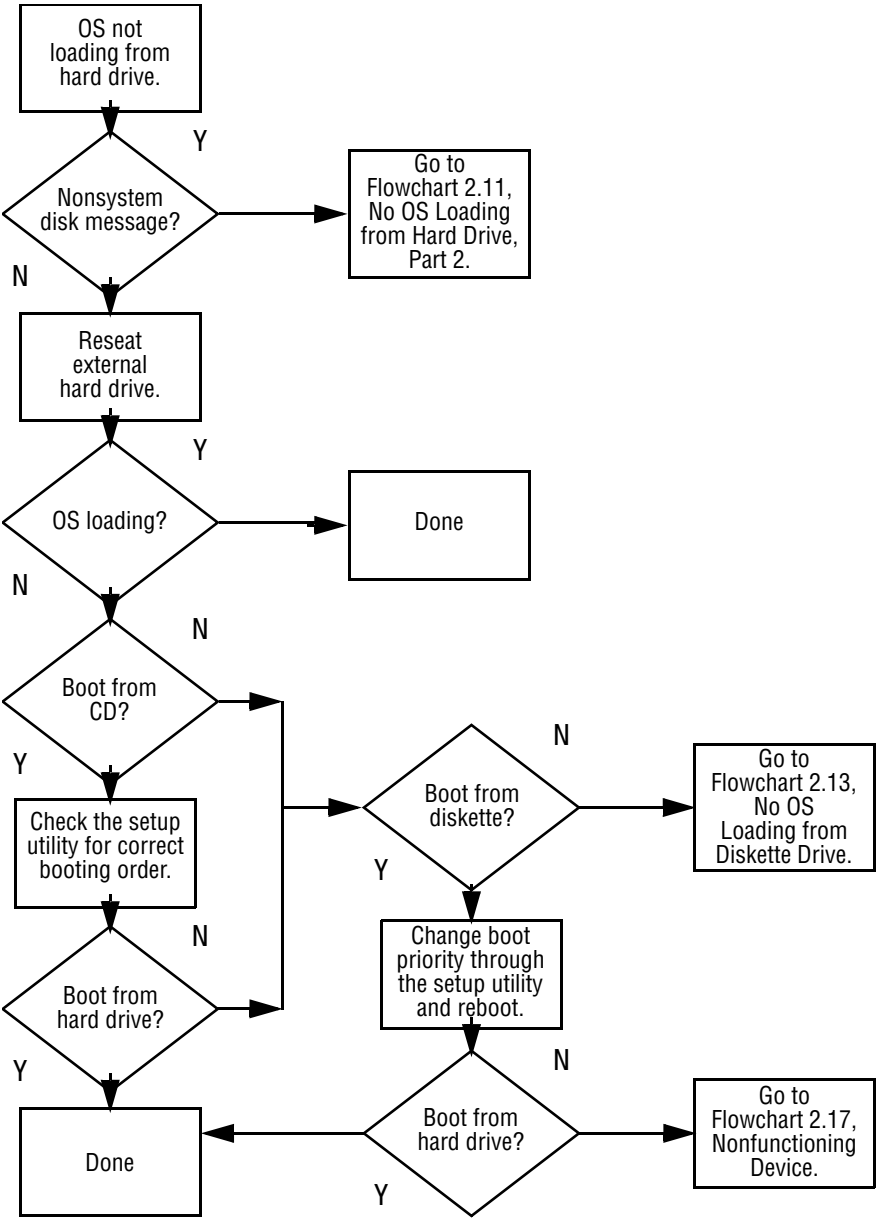
Flowchart 2.8 - Nonfunctioning Docking Station (if applicable)


Nonfunctioning docking station.
Reseat power cord in docking station and power outlet.
Check voltage setting on docking station.
Reset monitor cable connector at docking station.
Docking station operating?
Y
Done
N
Remove notebook, reseat all internal parts, and replace any damaged items in docking station.
Reinstall notebook into docking station.
Docking station operating?
Y
Done
N
Replace the following docking station components one at a time. Check notebook operation after each replacement.
1. Power supply
2. I/O board
3. Backplane board
4. Switch box
5. Docking motor mechanism

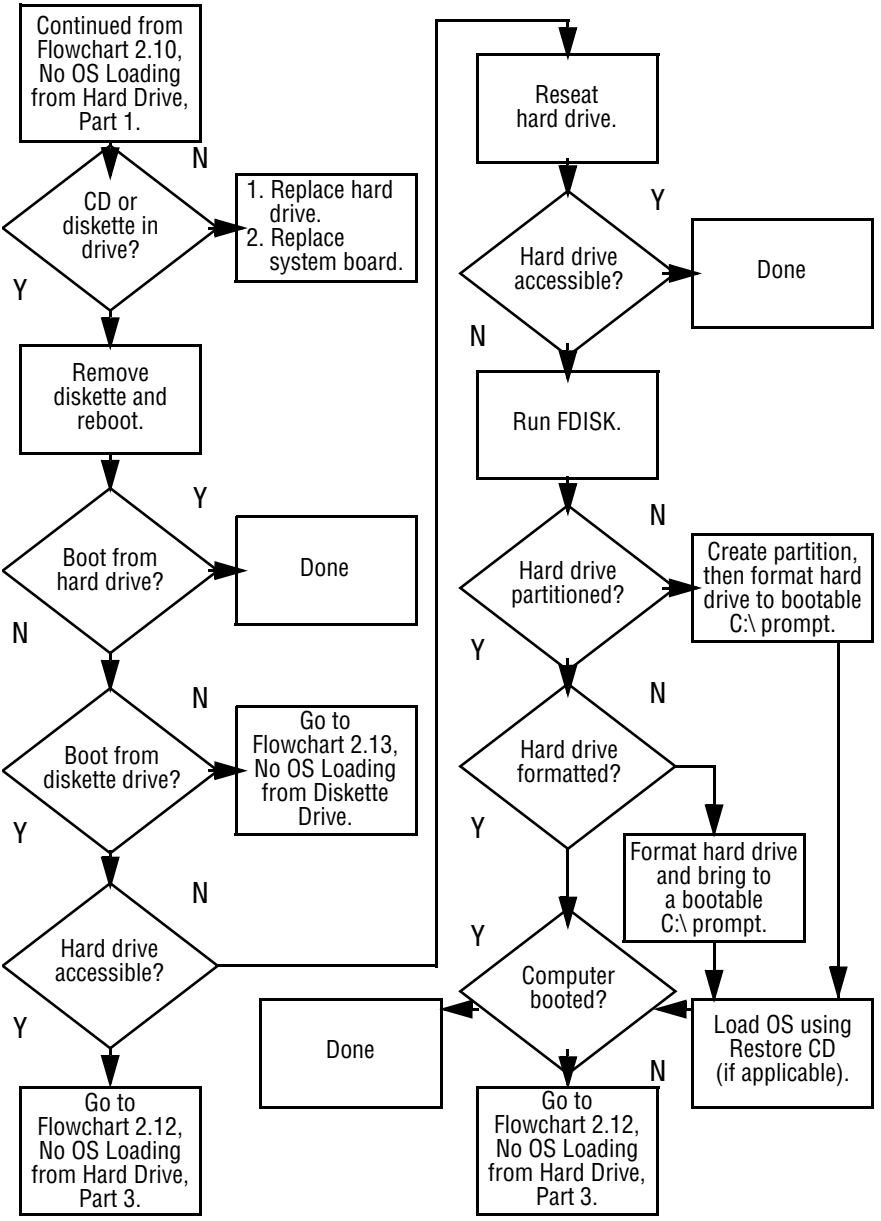
Flowchart 2.9 - No Operating System (OS) Loading


No OS loading.*
Reseat power cord in docking station and power outlet.
* Before beginning troubleshooting, always check cable connections, cable ends, and drives for bent or damaged pins.
No OS loading from hard drive, go to Flowchart 2.10, No OS Loading from Hard Drive, Part 1.
No OS loading from diskette drive, go to Flowchart 2.13, No OS Loading from Diskette Drive.
No OS loading from CD- or DVD-ROM drive, go to Flowchart 2.14, No OS Loading from CD- or DVD-ROM Drive.

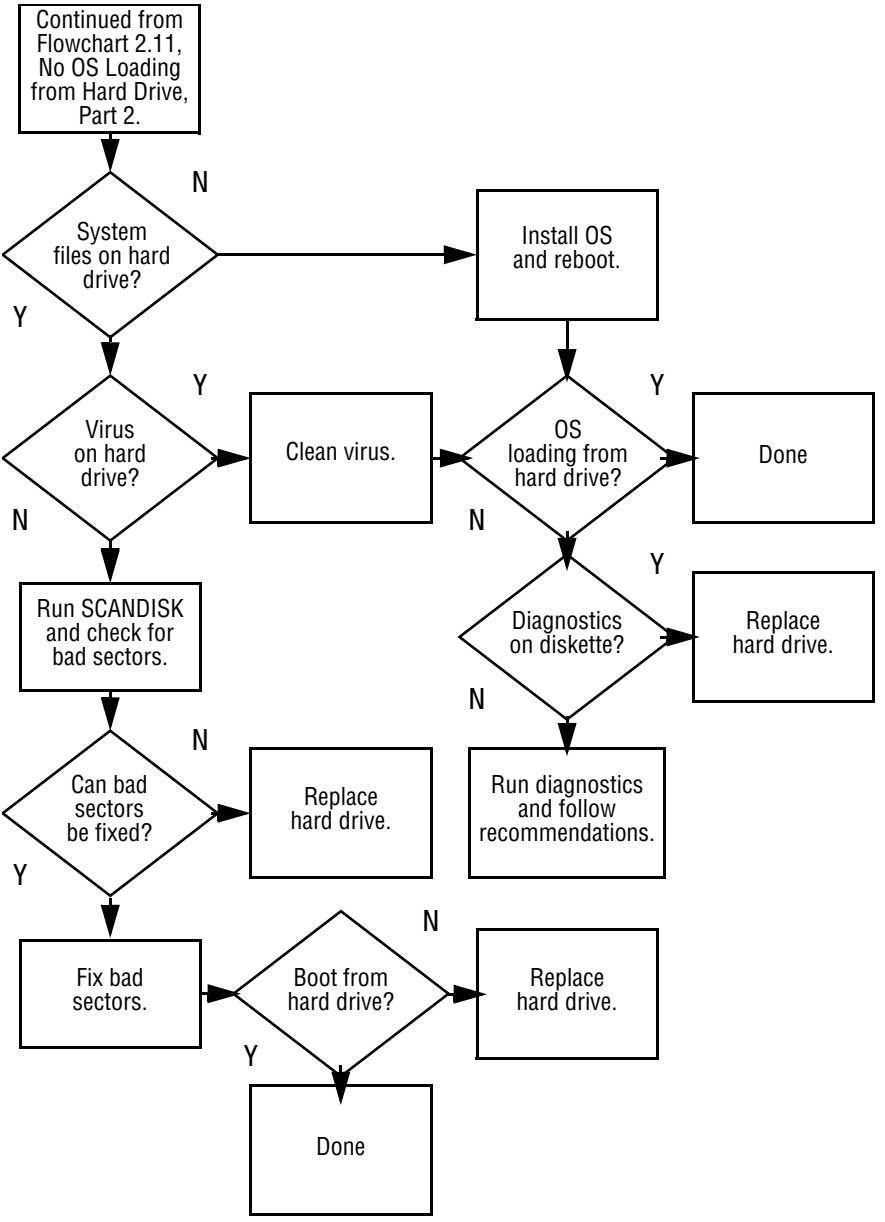
Flowchart 2.10 - No OS Loading from Hard Drive, Part 1



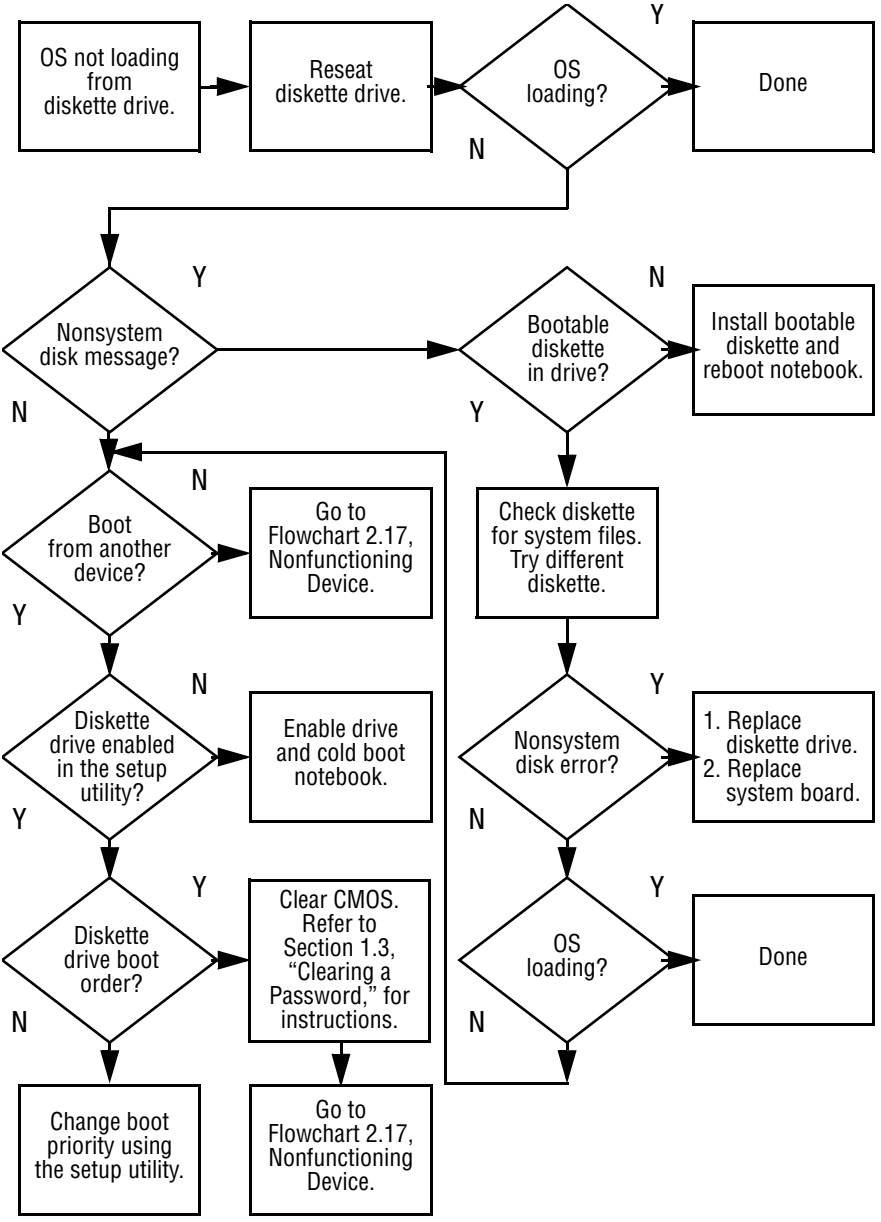
Flowchart 2.11 - No OS Loading from Hard Drive, Part 2



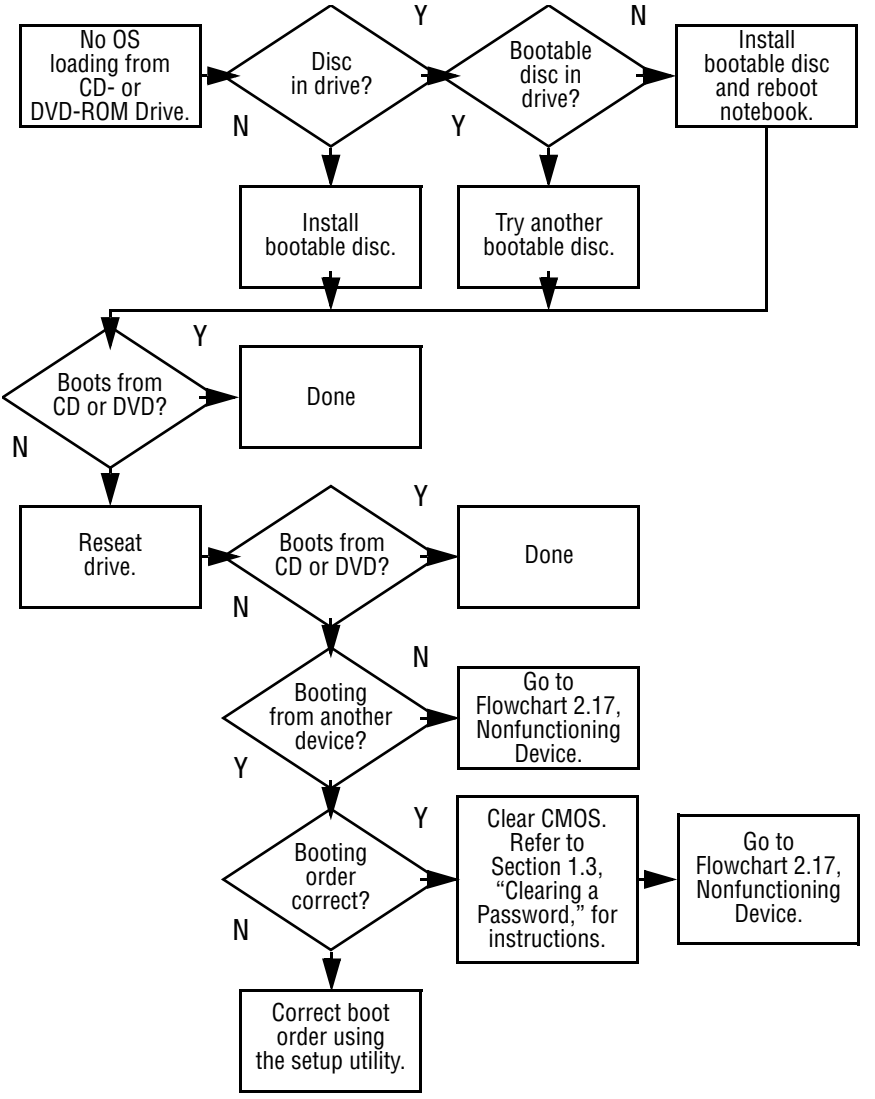
Flowchart 2.12 - No OS Loading from Hard Drive, Part 3



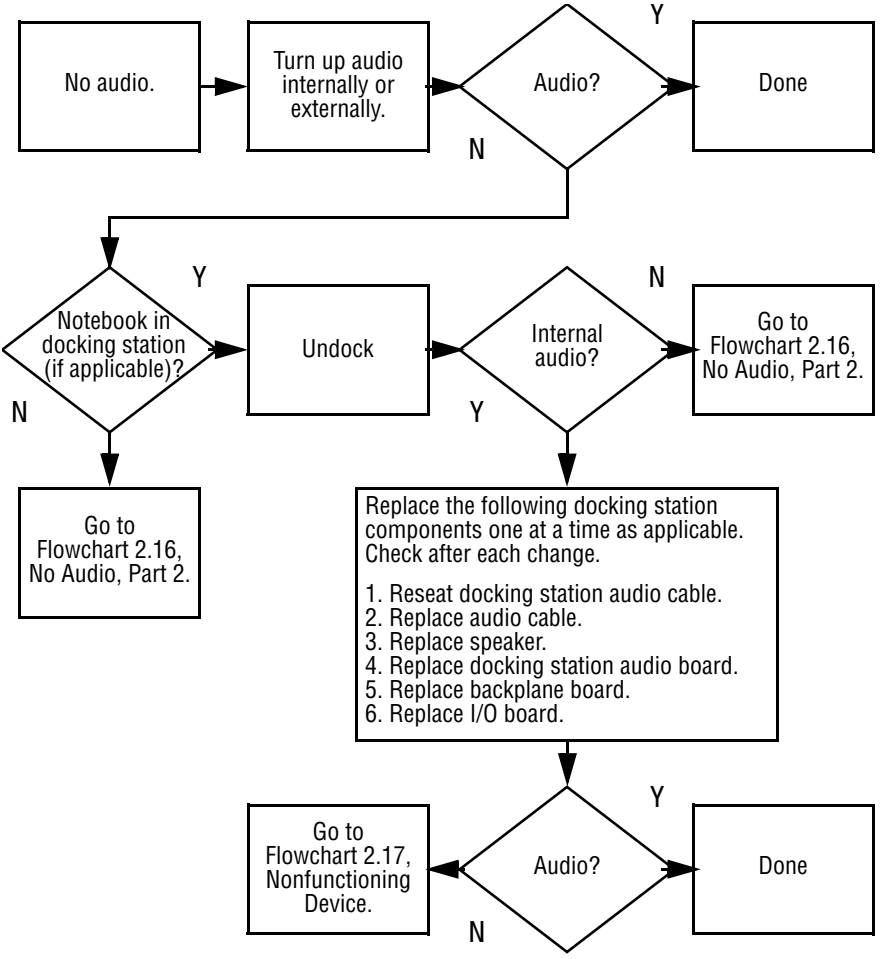
Flowchart 2.13 - No OS Loading from Diskette Drive



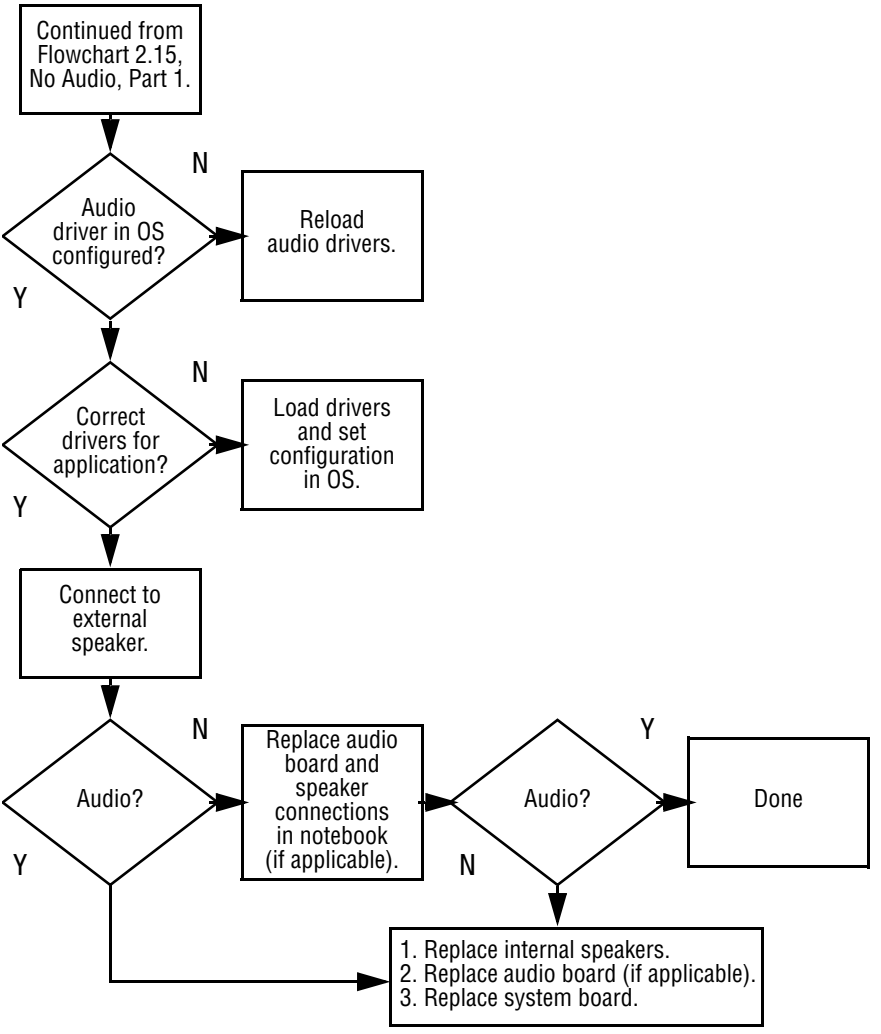
Flowchart 2.14 - No OS Loading from CD- or DVD-ROM Drive



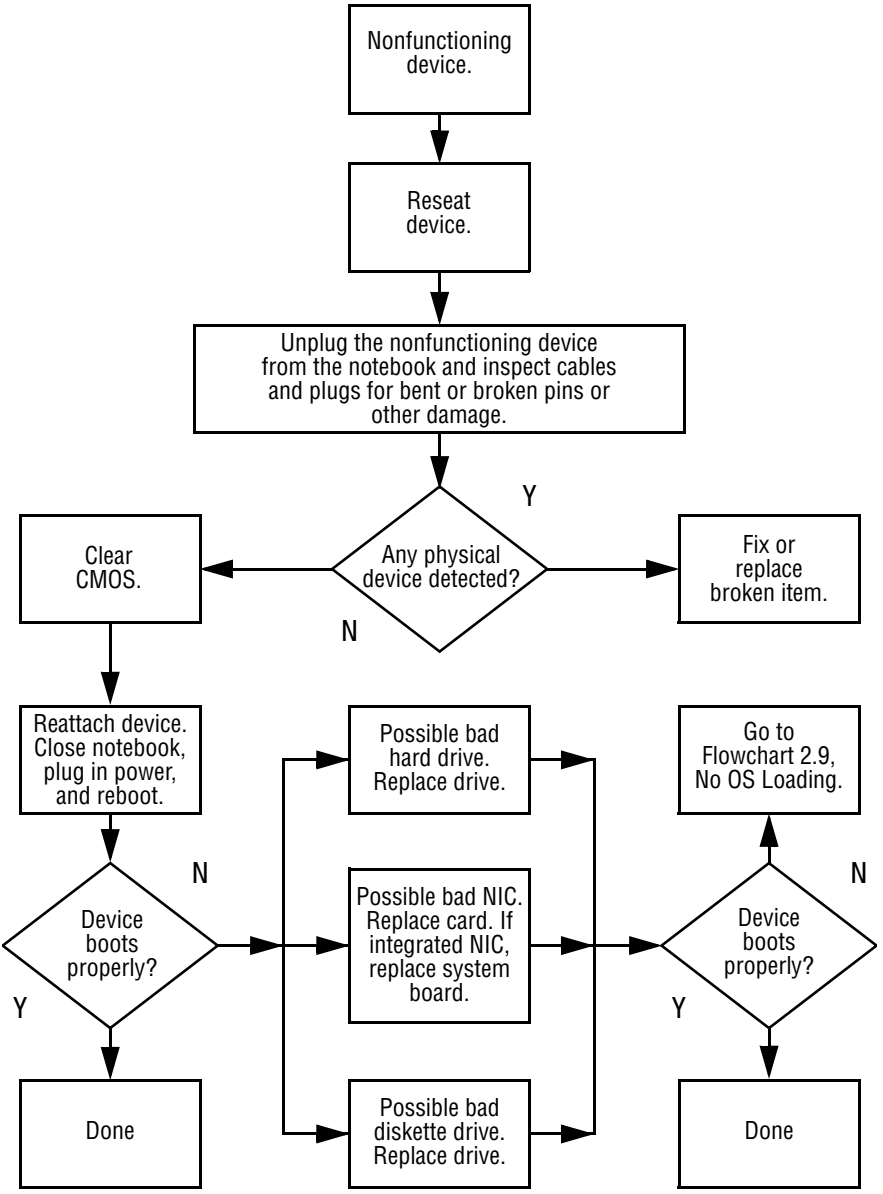
Flowchart 2.15 - No Audio, Part 1



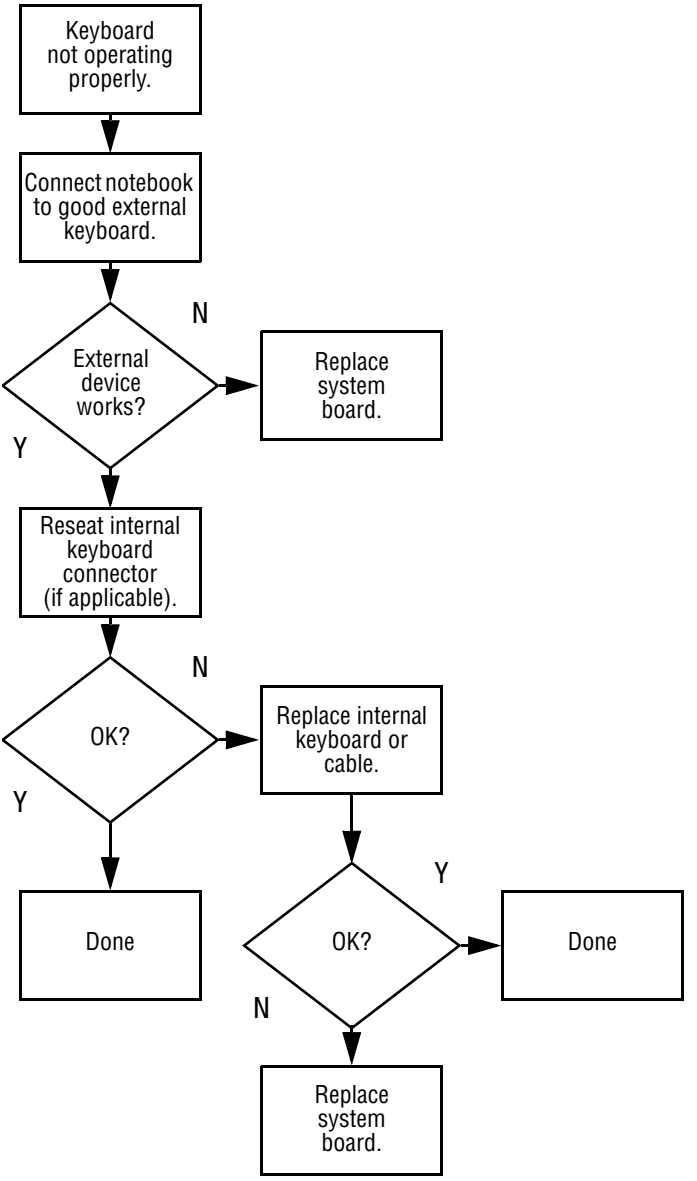
Flowchart 2.16 - No Audio, Part 2



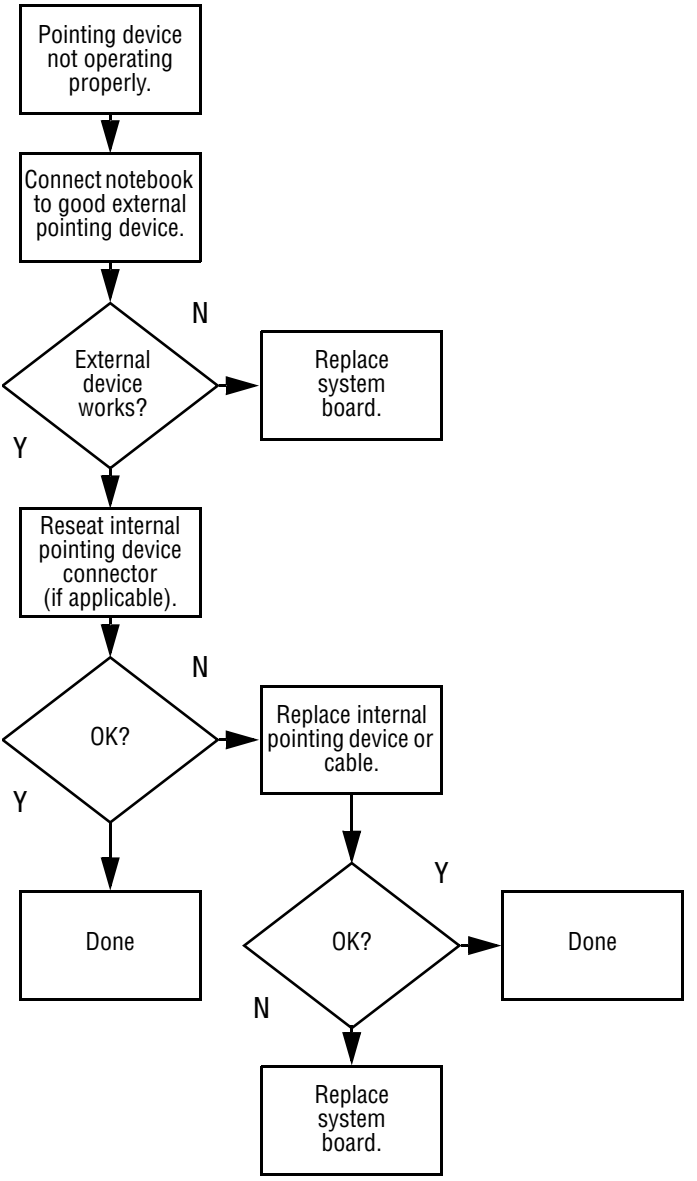
Flowchart 2.17 - Nonfunctioning Device


Nonfunctioning device.
Reseat device.
Unplug the nonfunctioning device from the notebook and inspect cables and plugs for bent or broken pins or other damage.
Any physical device detected?
Y
N
Clear CMOS.
Fix or replace broken item.
Reattach device. Close notebook, plug in power, and reboot.
Device boots properly?
N
Y
Possible bad hard drive. Replace drive.
Possible bad NIC. Replace card. If integrated NIC, replace system board.
Possible bad diskette drive. Replace drive.
Done
Go to Flowchart 2.9, No OS Loading.
Device boots properly?
N
Y
Done

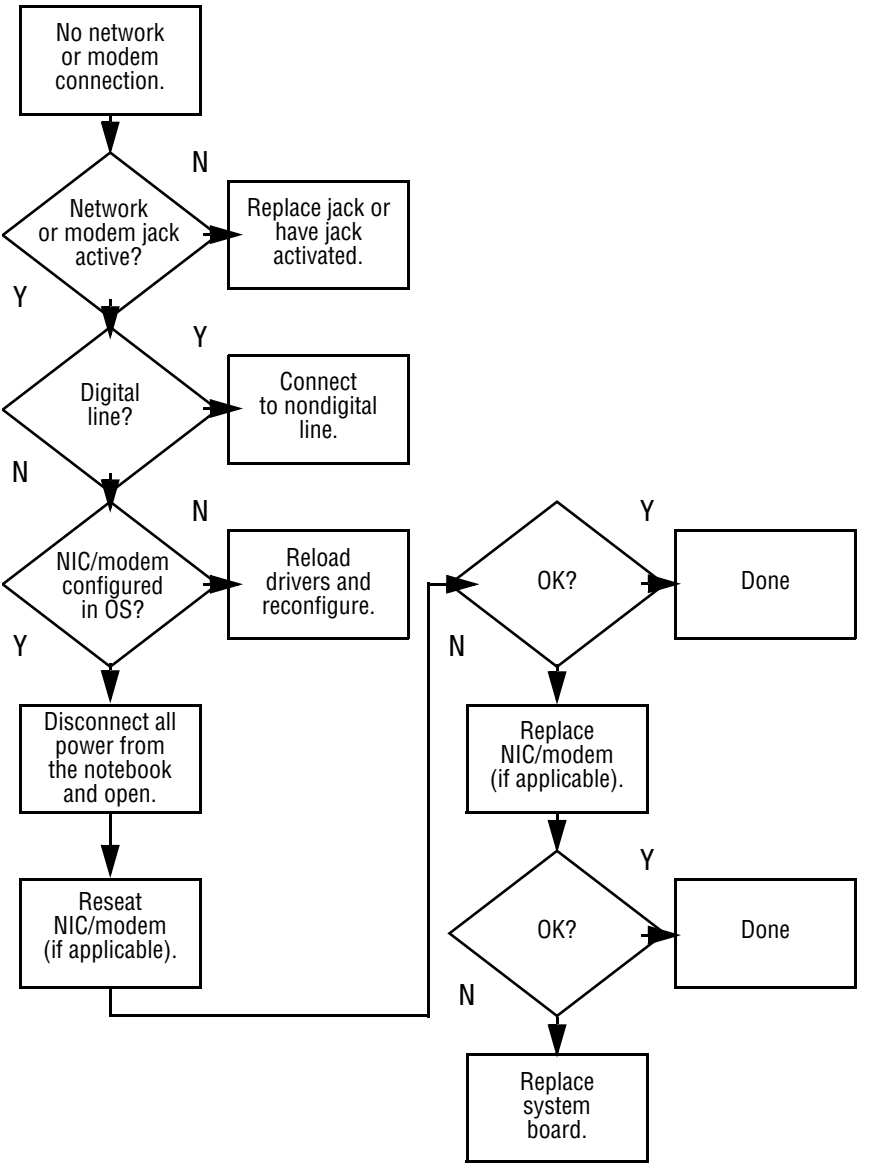
Flowchart 2.18 - Nonfunctioning Keyboard



Flowchart 2.19 - Nonfunctioning Pointing Device



Flowchart 2.20 - No Network or Modem Connection



3

Illustrated Parts Catalog

This chapter provides an illustrated parts breakdown and a reference for spare part numbers and option part numbers.

3.1 Serial Number Location

When ordering parts or requesting information, provide the notebook serial number and model number located on the bottom of the notebook (Figure 3-1).

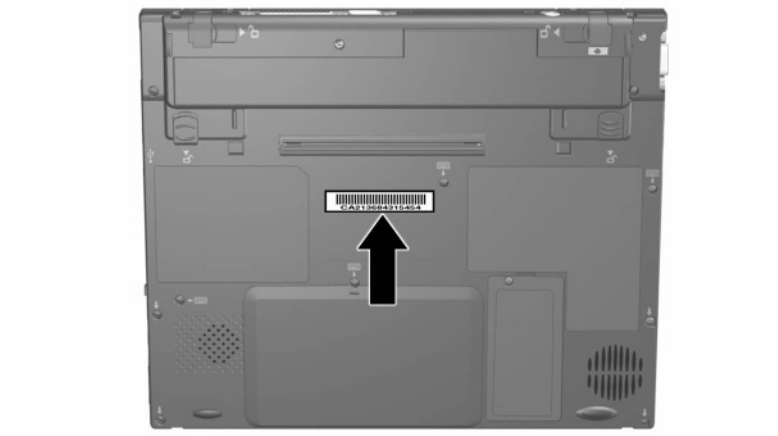


Figure 3-1. Serial Number Location

3.2 Computer System Major Components

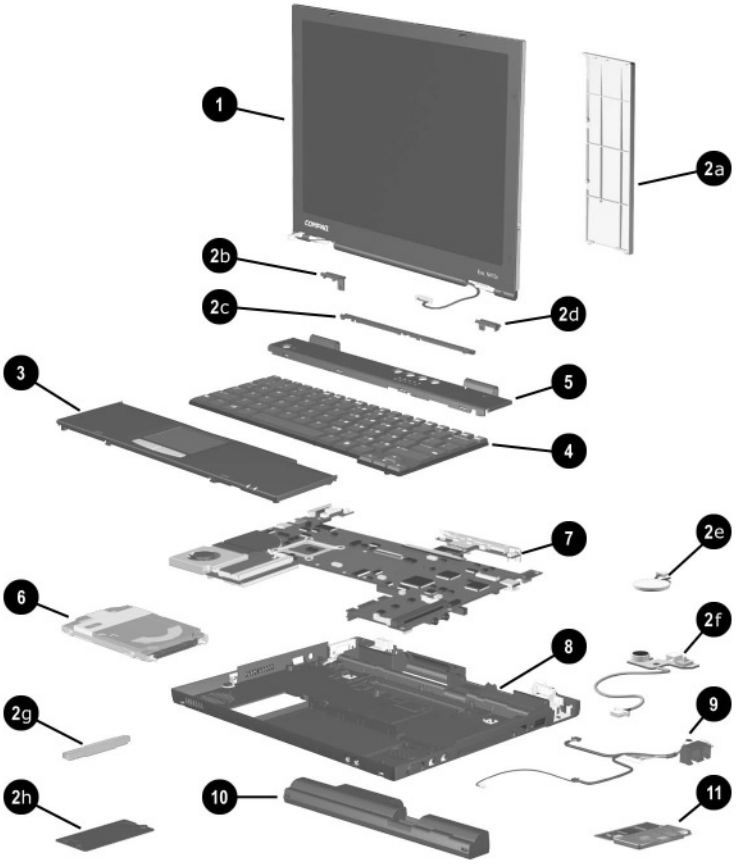
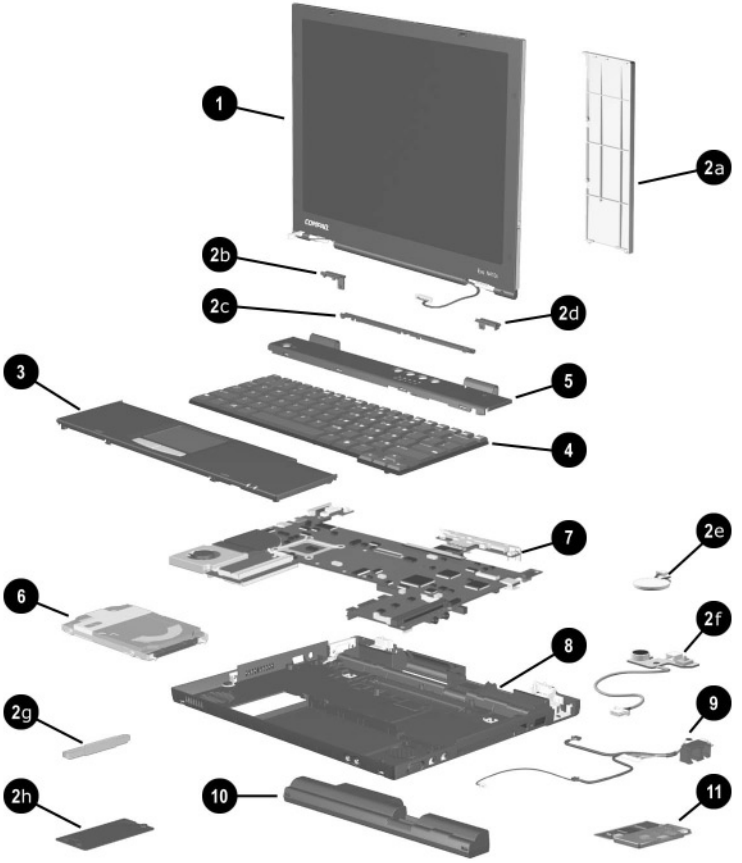


Figure 3-2. Computer System Major Components

Table 3-1
Computer System Major Components

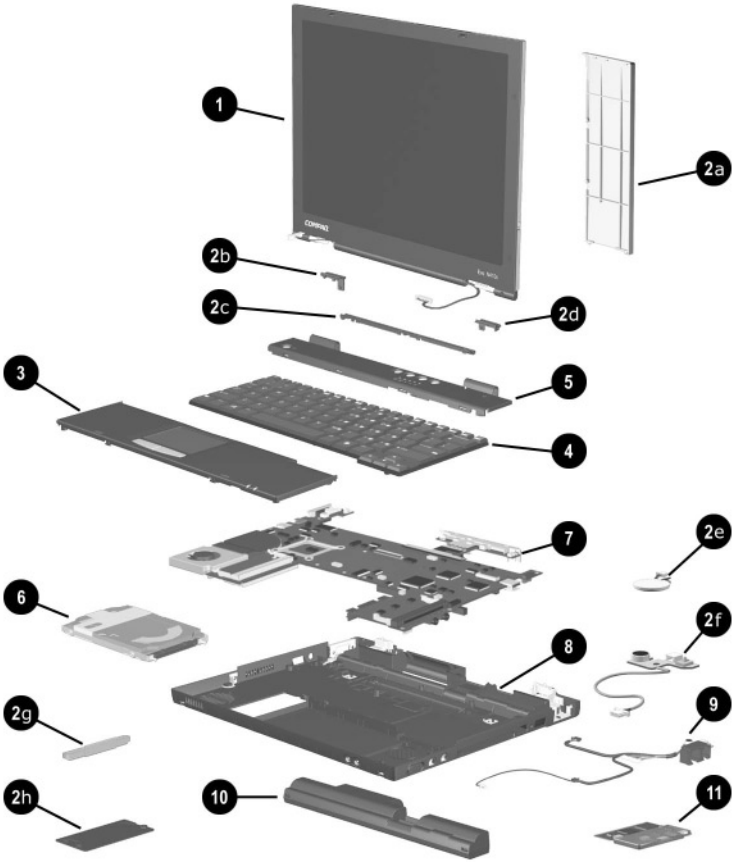
Item	Description		Spare Part Number
1	**Displays**		
	12.1-inch, XGA, CTFT (for use only with Evo Notebook N410c models)		292383-001
	12.1-inch, SVGA, CTFT (for use only with Evo Notebook N400c models)		231448-001
	Miscellaneous Plastics Kit		231454-001
2a	MultiPort cover	Not Illustrated	
2b	Left display support	■ TouchPad cable	
2c	Center display support	■ PC Card slot weight saver	
2d	Right display support	■ External battery slot spacers	
2e	RTC battery	■ Computer feet	
2f	Display lid switch board (used only with Evo Notebook N400c models)	■ External monitor connector cover	
2g	Hard drive spacer		
2h	Memory expansion compartment cover		
3	**Palm rests**		
	with TouchPad and two buttons (for use with TouchPad models)		231449-001
	with three buttons (for use with pointing stick models—Evo Notebook N400c models only)		231591-001



Computer System Major Components (continued)

Table 3-1
Computer System Major Components *(Continued)*

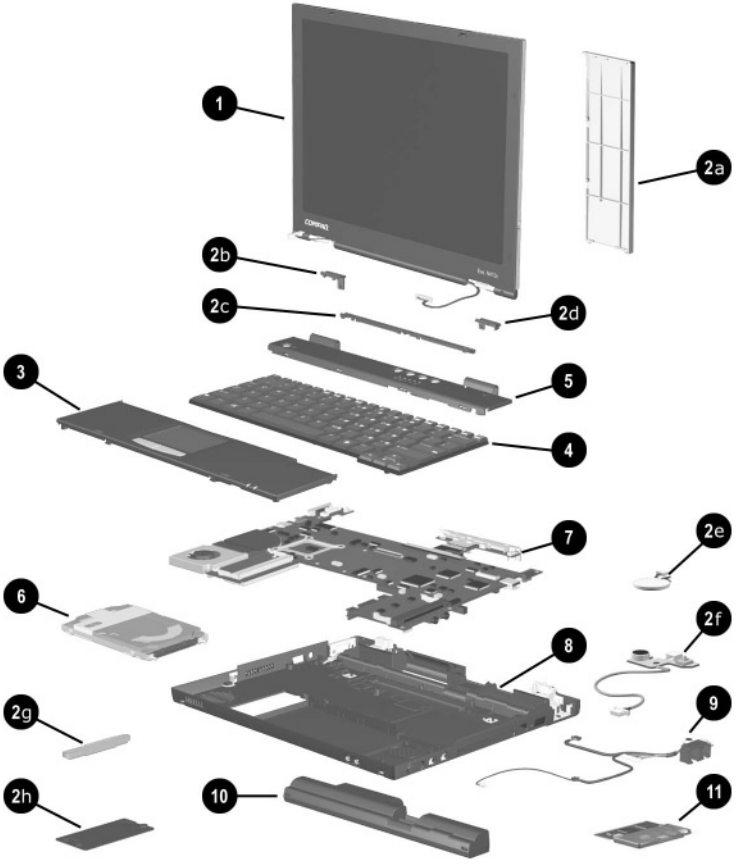
Item	Description			Spare Part Number
4	**Keyboard without pointing stick** (for use with TouchPad models)			
	Arabic	230514-171	Korean	230514-AD1
	Belgian	230514-181	Latin American Spanish	230514-161
	Brazilian	230514-201		230514-091
	Czech	230514-221	Norwegian	230514-131
	Danish	230514-081	Portuguese	230514-251
	French	230514-051	Russian	230514-BA1
	French Canadian	230514-121	Slovakian	230514-071
	German	230514-041	Spanish	
	Greek	230514-151	Swedish/ Finnish	230514-101
	Hebrew	230514-211		230514-111
	Hungarian	230514-BB1	Swiss	230514-AB1
	International	230514-002	Taiwanese	230514-141
	Italian	230514-061	Turkish	230514-031
	Japanese	230514-291	U.K. English	230514-001
			U.S. English	
	Keyboard with pointing stick (for use only with Evo Notebook N400c models)			
	Belgian	230515-181	Latin American Spanish	230515-161
	Brazilian	230515-201	Norwegian	230515-091
	Czech	230515-221	Portuguese	230515-131
	Danish	230515-081	Spanish	230515-071
	French	230515-051	Swedish/ Finnish	230515-101
	French Canadian	230515-121	Swiss	230515-111
	German	230515-041	Taiwanese	230515-AB1
	Hungarian	230515-211	Turkish	230515-141
	International	230515-002	U.K. English	230515-031
	Italian	230515-061	U.S. English	230515-001
	Japanese	230515-291		
	Korean	230515-AD1		



Computer System Major Components (continued)

Table 3-1
Computer System Major Components *(Continued)*

Item	Description	Spare Part Number
5	**Switch cover**	231453-001
6	**Hard drives**	
	40 GB	265495-001
	30 GB	304095-001
	20 GB	235540-001 and 218371-001
	10 GB	218370-001
7	**System boards** (includes fan and heat sink)	
	For use only with Evo Notebook N410c models	
	1.20-GHz Intel Pentium III processor	292387-001
	1.00-GHz Intel Pentium III processor	292386-001
	For use only with Evo Notebook N400c models	
	850-MHz Intel Pentium III processor	253104-001
	700-MHz Intel Pentium III processor	231446-001
8	**Base enclosures**	
	For use only with Evo Notebook N410c models (includes NTSC module and battery terminals)	292384-001
	For use only with Evo Notebook N410c models (includes NTSC module, RJ45/RJ11 module, and battery terminals)	231452-001



Computer System Major Components (continued)

Table 3-1
Computer System Major Components *(Continued)*

Item	Description	Spare Part Number
9	**Modem cables**	
	For use only with Evo Notebook N410c models (includes RJ45/RJ11 connector module, display lid switch board, microphone, and modem/microphone/NIC cable bundle)	302781-001
	For use only with Evo Notebook N400c models (includes display lid switch board, microphone, and microphone cable)	231451-001
10	**Battery packs**	
	Primary Li ion battery pack, 4 cell	
	For use only with Evo Notebook N410c models	292389-001
	For use with Evo Notebook N410c and N400c models	231445-001
	External Li ion battery pack, 4 cell	230609-001
	External high capacity battery pack, 9 cell	
	For use only with Evo Notebook N410c models	292388-001
	For use with Evo Notebook N410c and N400c models	155065-001
11	**Mini PCI communication boards**	
	Lucent Win Modem + Intel PRO-100 (S)P Mobile Combo Adapter	230339-001
	Type III mini PCI combination 56 Kbps modem/NIC board	230338-001
	Type III mini PCI 56 Kbps modem board	230337-001

3.3 Miscellaneous Plastics Kit Components

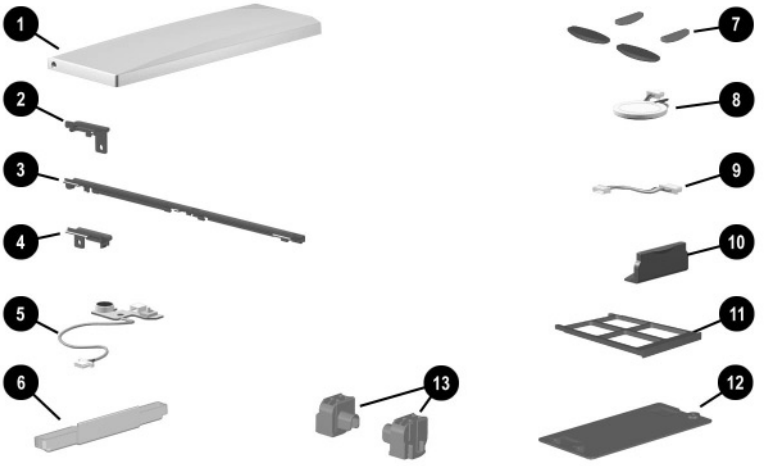


Figure 3-3. Miscellaneous Plastics Kit Components

Table 3-2
Miscellaneous Plastics Kit Components
Spare Part Number 231454-001

Item	Description	Item	Description
1	MultiPort cover	8	RTC battery
2	Right display support	9	TouchPad cable
3	Center display support	10	External monitor connector cover
4	Left display support	11	PC Card slot weight saver
5	Display lid switch board (used only with Evo Notebook 400c models)	12	Memory expansion compartment cover
6	Hard drive spacer	13	External battery slot spacers
7	Computer feet		

3.4 Mass Storage Devices

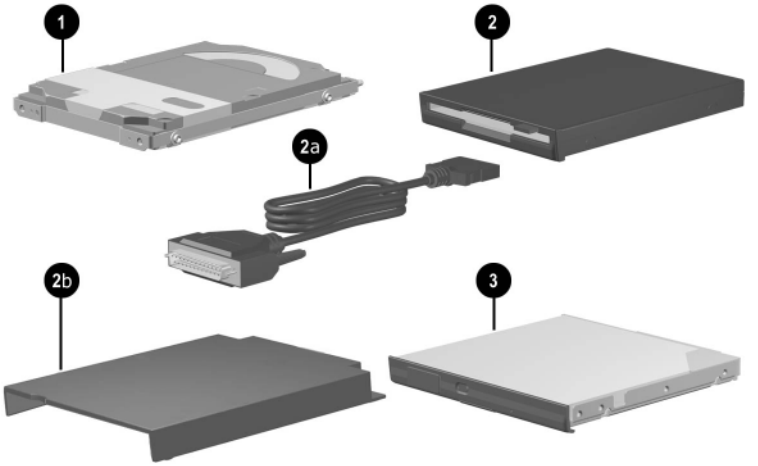


Figure 3-4. Mass Storage Devices

Table 3-3
Mass Storage Devices

Item	Description	Spare Part Number
1	**Hard drives**	
	40 GB	265495-001
	30 GB	304095-001
	20 GB	235540-001 and 218371-001
	10 GB	218370-001
2	**External diskette drive**	241995-001 and 135233-001
2a	External diskette drive cable	135232-001
2b	External diskette drive cradle	175375-001
3	**Optical drives**	
	The following options are for use only with the Mobile Expansion Unit:	
	8X Max DVD-ROM drive	173949-001 and 202837-001
	24X Max CD-ROM drive	228746-001
	CD-RW drive	153992-001
	DVD-ROM/CD-RW combination drive	238878-001

3.5 Miscellaneous Spare Parts

Table 3-4
Miscellaneous Spare Parts (not illustrated)

Description	Spare Part Number
Automobile adapter	261699-001
Battery charger	153991-001
Bluetooth MultiPort Module	230336-001
External AC adapters	
65 W, slim line	239704-001
50 W, slim line	163444-001
Memory expansion boards	
For use only with Evo Notebook N410c models	
133 MHz, 256 MB	238879-001
133 MHz, 256 MB	212683-001
133 MHz, 128 MB	212682-001
133 MHz, 128 MB	212681-001
For use with all Evo Notebook N410c and N400c models	
100 Mhz, 256 MB	167136-001
100 Mhz, 128 MB	135244-001
100 Mhz, 64 MB	135243-001

Table 3-4
Miscellaneous Spare Parts (not illustrated) *(Continued)*

Description	Spare Part Number
Mobile Expansion Units	
For use only with Evo Notebook N410c models	292385-001
For use with Evo Notebook N410c and N400c models	231450-001
Power cords (3 W, black, 6 feet)	
Australian	246959-011
Danish	246959-081
European/Middle Eastern/African	246959-021
Italian	246959-061
Japanese	246959-291
Korean	246959-AD1
Swiss	246959-AG1
U.K. English	246959-031
U.S. English	246959-001
Miscellaneous Screw Kit, includes the following screws (Refer to Appendix C, "Screw Listing," for more information on screw specifications and usage.) ■ Torx T8 Metric 2.0 × 6.0 ■ Torx T8 Metric 2.0 × 3.5 ■ Phillips P0 Metric 2.0 × 5.0 ■ 5.0 mm × 9.5 screwlock ■ Phillips P0 Metric 2.0 × 3.0 ■ Phillips P0 Metric 2.0 × 4.0 ■ Phillips P0 Metric 2.0 × 7.0 barrel screw	231455-001

Table 3-4
Miscellaneous Spare Parts (not illustrated) *(Continued)*

Description			Spare Part Number
Modems			
Type III mini PCI combination 56 Kbps modem/NIC board			233558-001
Type III mini PCI 56 Kbps modem board			233557-001
PC Card modem			233564-001
Modem adapters			
Czech	234963-221	Norwegian	234963-091
German	304398-041	Swiss	198294-111
Hungarian	234963-211		
Modem cable			234962-001
Modem cable adapters			
Australian	304398-011		
Belgian	304398-181l		
French	304398-051		
RJ-11 P55 adapters			
Danish	316904-081	Italian	316904-061
Finnish	316904-351	Swedish	316904-101
RJ-11 PTT adapter (used in the United Kingdom)			158593-031

4

Removal and Replacement Preliminaries

This chapter provides essential information for proper and safe removal and replacement service.

4.1 Tools Required

You will need the following tools to complete the removal and replacement procedures:

- Magnetic screwdriver
- Phillips P0 screwdriver
- Torx T8 screwdriver
- Tool kit (includes connector removal tool, loopback plugs, and case utility tool)

4.2 Service Considerations

The following sections include some of the considerations that you should keep in mind during disassembly and assembly procedures.

As you remove each subassembly from the notebook, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic Parts

Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and Connectors

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Ensure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

CAUTION: When servicing the notebook, ensure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the notebook.

4.3 Preventing Damage to Removable Drives

Removable drives are fragile components that must be handled with care. To prevent damage to the notebook, damage to a removable drive, or loss of information, observe the following precautions:

- Before removing or inserting a hard drive, shut down the notebook. If you are unsure whether the notebook is off or in Hibernation, turn the notebook on, then shut it down.
- Before removing a diskette drive or optical drive, ensure that a diskette or disc is not in the drive. Ensure that the optical drive tray is closed.
- Before handling a drive, ensure that you are discharged of static electricity. While handling a drive, avoid touching the connector.
- Handle drives on surfaces that have at least one inch of shock-proof foam.
- Avoid dropping drives from any height onto any surface.
- After removing a hard drive, CD-ROM drive, or a diskette drive, place it in a static-proof bag.
- Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.
- Avoid exposing a drive to temperature extremes or to liquids.
- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable form of protective packaging and label the package “Fragile: Handle With Care.”

4.4 Preventing Electrostatic Damage

Many electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases the discharge contains enough power to alter device parameters or melt silicon junctions.

A sudden discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs.

An electronic device exposed to electrostatic discharge may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

4.5 Packaging and Transporting Precautions

Use the following grounding precautions when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe containers, such as tubes, bags, or boxes.
- Protect all electrostatic-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a sensitive component or assembly.

- Store reusable electrostatic-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyers made of antistatic belts and roller bushings. Ensure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

4.6 Workstation Precautions

Use the following grounding precautions at workstations:

- Cover the workstation with approved static-dissipative material (refer to Table 4-2).
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When using fixtures that must directly contact dissipative surfaces, only use fixtures made of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle electrostatic-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

4.7 Grounding Equipment and Methods

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, connect a wrist strap with alligator clips.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one-megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

Other grounding equipment recommended for use in preventing electrostatic damage includes:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one-megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages

- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

Table 4-1 shows how humidity affects the electrostatic voltage levels generated by different activities.

Table 4-1
Typical Electrostatic Voltage Levels

	Relative Humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

✎ A product can be degraded by as little as 700 V.

Table 4-2 lists the shielding protection provided by antistatic bags and floor mats.

Table 4-2
Static-Shielding Materials

Material	Use	Voltage Protection Level
Antistatic plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5

Removal and Replacement Procedures

This chapter provides removal and replacement procedures.

There are 31 different Torx T8 and Phillips screws and screwlocks, in 6 different sizes, that must be removed when servicing the notebook. Make special note of the size and location of each screw during removal and replacement.

Refer to Appendix C, “Screw Listing,” for detailed information on screw sizes, locations, and usage.

5.1 Serial Number

Report the notebook serial number to Compaq when requesting information or ordering spare parts. The serial number is located on the bottom of the notebook (Figure 5-1).

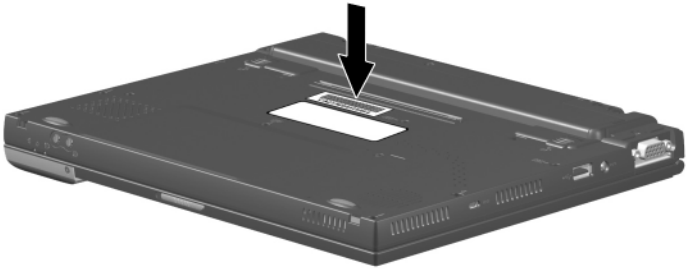


Figure 5-1. Serial Number Location

5.2 Disassembly Sequence Chart

Use the chart below to determine the section number to be referenced when removing notebook components.

Table 5-1
Disassembly Sequence Chart

Section	Description	# of Screws Removed
5.3	Preparing the notebook for disassembly Primary battery pack Optional external battery pack	0
5.4	Computer feet	0
5.5	Palm rest	4
5.6	Memory expansion board	1
5.7	Hard drive	0
5.8	Mini PCI communications board	0
5.9	Keyboard	4
5.10	Real time clock (RTC) battery	0
5.11	Switch cover	4
5.12	Display	4
5.13	Modem cable	2
5.14	System board	12 on Evo Notebook N410c models 10 on Evo Notebook N400c models

5.3 Preparing the Notebook for Disassembly

Perform the following steps before disassembling the notebook:

1. Turn off the notebook.
2. Undock the notebook and Mobile Expansion Unit (MEU) from the docking base, if applicable.
3. Disconnect the notebook from the MEU, if applicable.
4. Disconnect the AC adapter and external devices.
5. Remove the primary battery pack by following these steps:
   a. Turn the notebook bottom side up with the front facing forward.

b. Slide the left primary battery release latch forward ❶ (Figure 5-2).

c. Slide the right primary battery release latch forward and hold it in place ❷.

d. Swing the front edge of the primary battery pack up and back ❸.

e. Lift the primary battery pack out of the battery bay ❹.

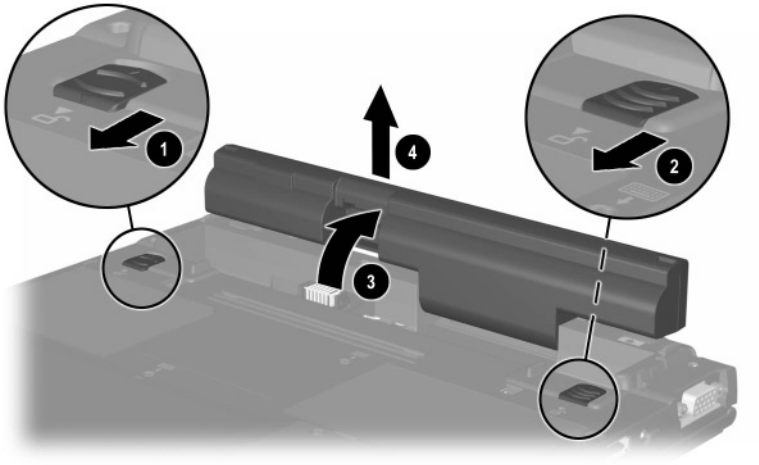


Figure 5-2. Removing the Primary Battery Pack

6. Remove the optional external battery pack, if installed, by following these steps:
   a. Turn the notebook bottom side up with the front facing forward.
   b. Make sure the external battery pack is located behind the notebook rear panel.
   c. Slide the external battery release latches toward the inside of the notebook ❶ (Figure 5-3).
   d. Rotate the external battery pack 90 degrees toward the notebook ❷.
   e. Remove the battery pack from the notebook ❸.

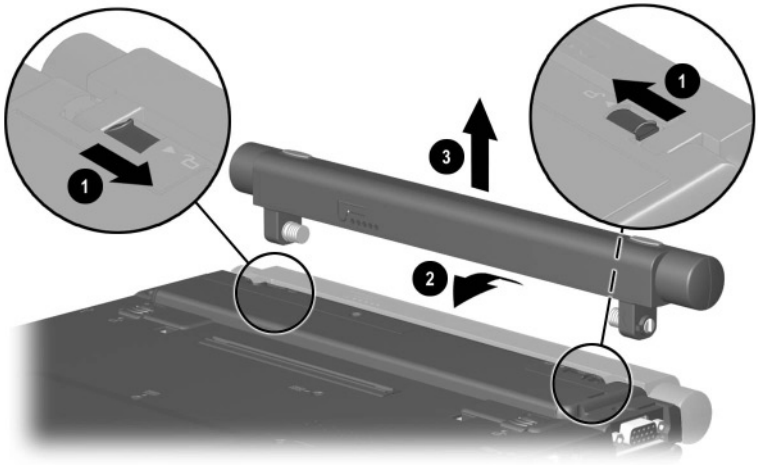


Figure 5-3. Removing the Optional External Battery Pack

5.4 Computer Feet

The base feet are adhesive-backed rubber pads. The base feet are included in the Miscellaneous Plastics Kit (spare part number 231454-001). Refer to Figure 5-4 for the locations of the notebook feet.

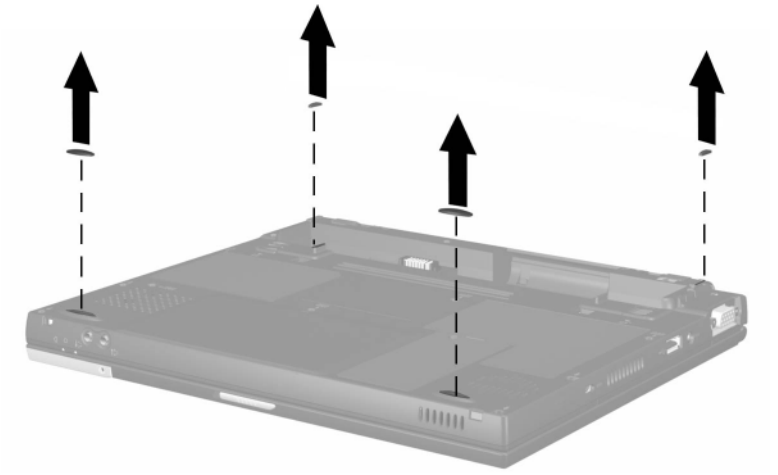


Figure 5-4. Replacing the Computer Feet

5.5 Palm Rest

Palm Rest Spare Part Number Information	
Palm rests	
with TouchPad and two buttons (for use with TouchPad models)	231449-001
with three buttons (for use with pointing stick models—Evo Notebook N400c models only)	231591-001

The palm rest must be removed to access the internal memory expansion slot, the hard drive, and the modem/NIC board.

1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the front facing forward.

3. Remove the four TM2.0 × 6.0 screws that secure the palm rest to the base enclosure (Figure 5-5).

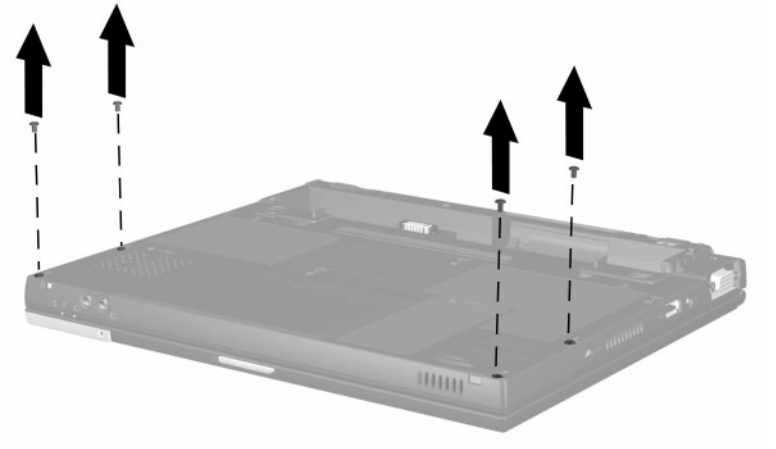


Figure 5-5. Removing the Palm Rest Screws

4. Turn the notebook top side up with the front facing forward.
5. Open the notebook.

6. Press forward on the back edge of the palm rest between the right side of the space bar and the right **Alt** key to disengage the palm rest from the base enclosure (Figure 5-6).

Figure 5-6. Releasing the Palm Rest

7. Lift up the back edge of the palm rest ❶ until the RTC battery ❷ and TouchPad cables ❸ prevent it from lifting any farther (Figure 5-7).

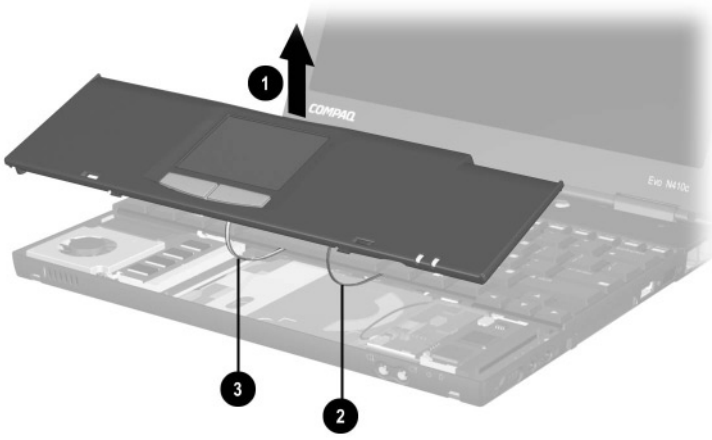


Figure 5-7. Releasing the Palm Rest (continued)

8. While holding the palm rest at a 45 degree angle, slide the front edge of the palm rest forward ❶ (Figure 5-8).
9. After the front edge of the palm rest clears the base enclosure, swing the front edge of the palm rest up and back ❷ and rest the palm rest on the keyboard ❸.

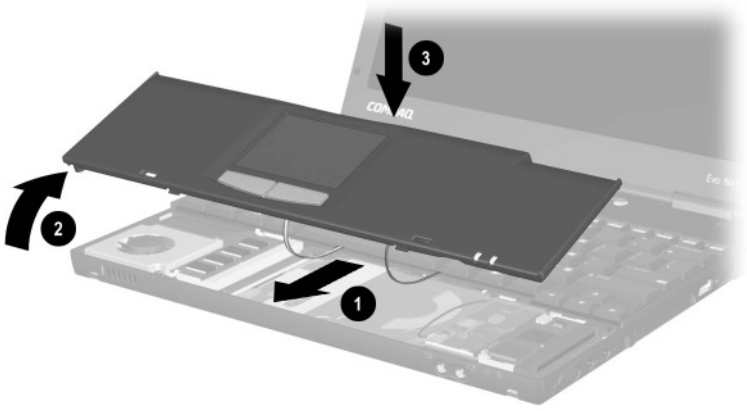


Figure 5-8. Releasing the Palm Rest (continued)

10. Remove the RTC battery from the retaining clip ❶ (Figure 5-9).

The RTC battery is included in the Miscellaneous Plastics Kit (spare part number 231454-001).

11. Disconnect the TouchPad cable ❷ from the connector on the TouchPad.

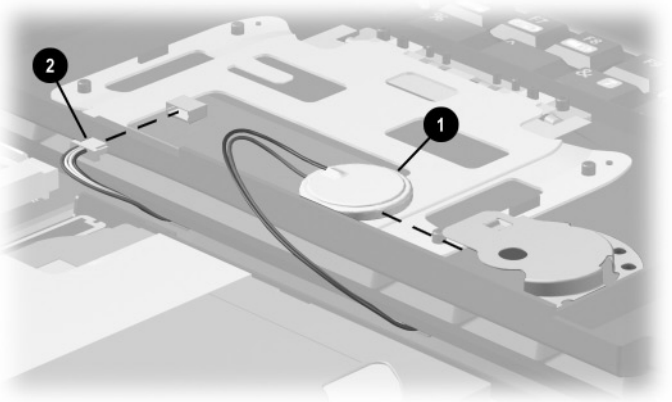


Figure 5-9. Removing the RTC Battery and Disconnecting the TouchPad Cable

Evo Notebook N400c models only—Models with pointing stick keyboards have a pointing stick button cable that needs to be disconnected prior to removing the palm rest. Perform Steps 12 and 13 before removing the palm rest on a pointing stick model.

12. Release the zero insertion force (ZIF) connector to which the pointing stick button cable is attached ❶ and disconnect the pointing stick button cable ❷ (Figure 5-10).

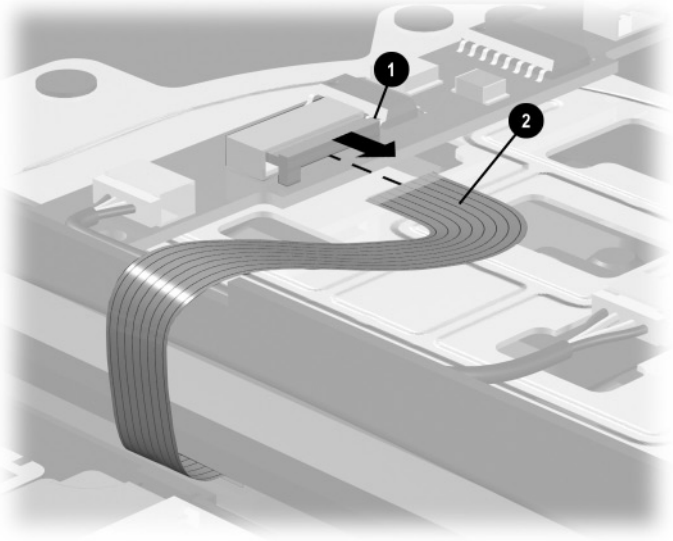


Figure 5-10. Disconnecting the Pointing Stick Button Cable

13. Remove the palm rest and set it aside.

Reverse the above procedure to install the palm rest.

Before installing the palm rest on TouchPad models, make sure the TouchPad ❶ and RTC battery cables ❷ are routed through the respective notches in the palm rest (Figure 5-11).

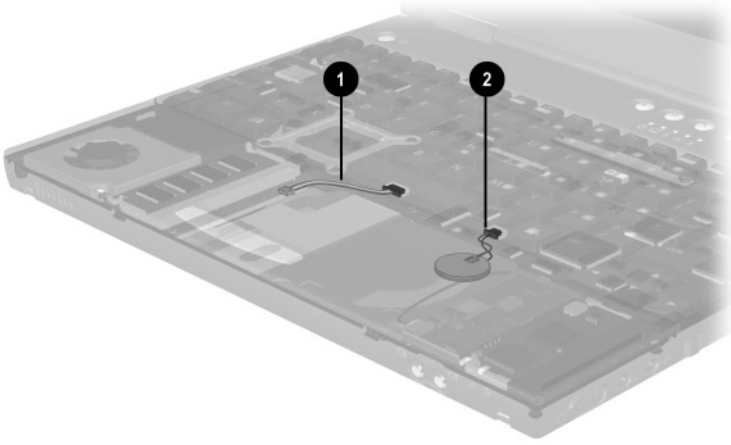


Figure 5-11. Routing the RTC Battery and TouchPad Cables

5.6 Memory Expansion Board

The Compaq Evo Notebook N410c notebook has two memory expansion slots: one is located on the bottom of the notebook and the other is located under the palm rest. The procedure for removing a memory expansion board from a memory expansion socket is identical for both locations.

Follow these steps to remove a memory expansion board from the slot in the bottom of the notebook:

1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the front facing forward.

3. Remove the TM2.0 × 6.0 screw ❶ that secures the memory expansion compartment cover to the base enclosure (Figure 5-12).
4. Lift the back edge of the memory expansion compartment cover and swing it up and forward ❷.

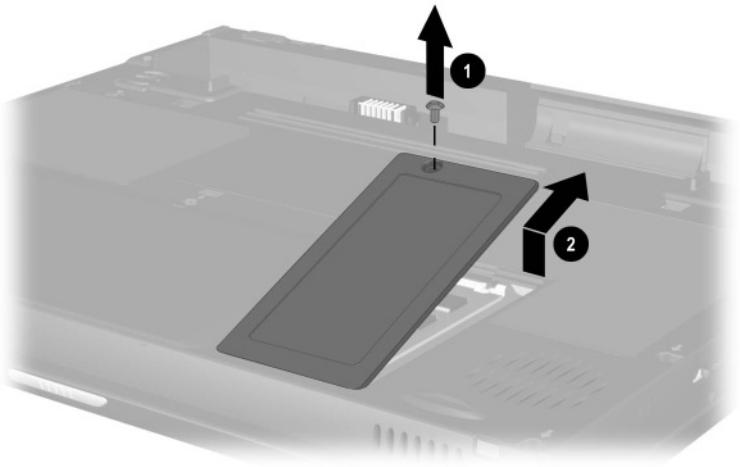


Figure 5-12. Removing the Memory Expansion Compartment Cover

5. Pull away the plastic retention clips on each side of the memory expansion board ❶. The memory expansion board tilts upward (Figure 5-13).
6. Lift the edge of the memory expansion board and slide it gently out of the memory expansion slot at a 45-degree angle ❷.

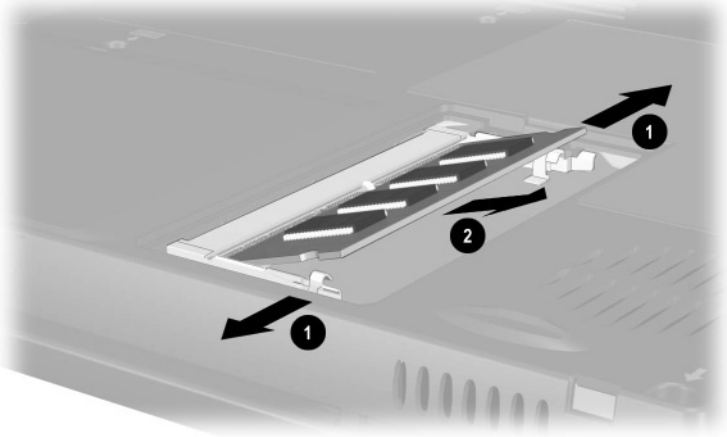


Figure 5-13. Removing a Memory Expansion Board

Follow these steps to remove a memory expansion board from the memory expansion slot under the palm rest:

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the palm rest (Section 5.5).
3. Pull away the plastic retention clips on each side of the memory expansion board ❶. The memory expansion board tilts upward (Figure 5-14).
4. Lift the edge of the memory expansion board and slide it gently out of the memory expansion slot at a 45-degree angle ❷.

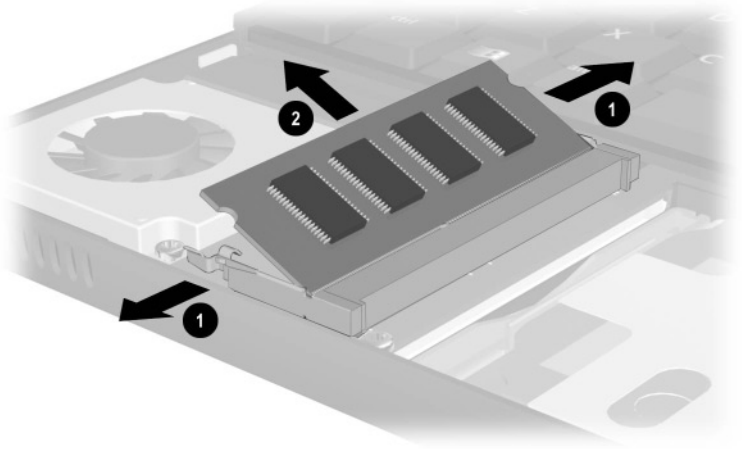


Figure 5-14. Removing a Memory Expansion Board

5.7 Hard Drive

Hard Drive Spare Part Number Information	
40 GB	265495-001
30 GB	304095-001
20 GB	235540-001 and 218371-001
10 GB	218370-001

CAUTION: To prevent damage to the notebook and hard drive and loss of information, shut down the notebook before removing the hard drive from the hard drive bay. Do not remove the hard drive while the notebook is on, in Standby, or in Hibernation. If you are not sure whether the notebook is in Hibernation, turn the notebook on, then shut it down. If the notebook is running a retail version of a Windows operating system, shut down the notebook before removing any drive.

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the palm rest (Section 5.5).

3. Remove the hard drive spacer ❶ from the base enclosure (Figure 5-15).

The hard drive spacer is included in the Miscellaneous Plastics Kit (spare part number 231454-001).

4. Grasp the hard drive tab and slide the hard drive to the left ❷.
5. Remove the hard drive.
6. Place the hard drive in an electrostatic-safe container.

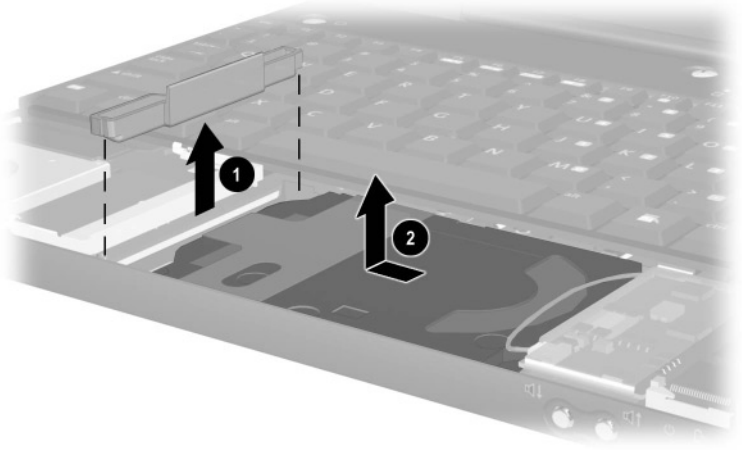


Figure 5-15. Removing the Hard Drive

Reverse the above procedure to install the hard drive.

CAUTION: When installing the hard drive, make sure the speaker and modem/NIC cables are not crimped between the back edge of the hard drive and the base enclosure.

5.8 Mini PCI Communications Board

Mini PCI Communications Board Spare Part Number Information	
Lucent Win Modem + Intel PRO-100 (S)P Mobile Combo Adapter	230339-001
Type III mini PCI combination 56 Kbps modem/NIC board	230338-001
Type III mini PCI 56 Kbps modem board	230337-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the palm rest (Section 5.5).

3. Disconnect the modem/NIC cable from the modem/NIC board ❶ (Figure 5-16).
4. Pull away the retention clips on each side of the modem/NIC board ❷. The modem/NIC board tilts upward.
5. Lift the edge of the modem/NIC board and slide it out of the connector at a 45-degree angle ❸.
6. Place the modem/NIC board in an electrostatic-safe container.

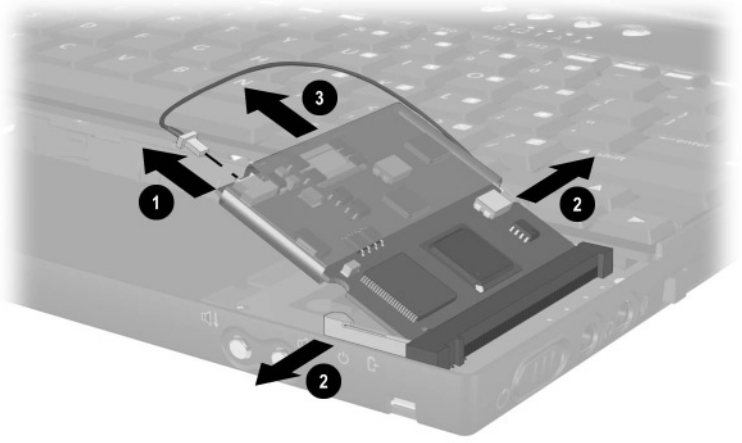


Figure 5-16. Removing the Modem/NIC Board

Reverse the above procedure to install the modem/NIC board.

5.9 Keyboard

Keyboard
Spare Part Number Information

Keyboard without pointing stick (for use with TouchPad models)

Arabic	230514-171	Korean	230514-AD1
Belgian	230514-181	Latin American Spanish	230514-161
Brazilian	230514-201	Norwegian	230514-091
Czech	230514-221	Portuguese	230514-131
Danish	230514-081	Russian	230514-251
French	230514-051	Slovakian	230514-BA1
French Canadian	230514-121	Spanish	230514-071
German	230514-041	Swedish/Finnish	230514-101
Greek	230514-151	Swiss	230514-111
Hebrew	230514-211	Taiwanese	230514-AB1
Hungarian	230514-BB1	Turkish	230514-141
International	230514-002	U.K. English	230514-031
Italian	230514-061	U.S. English	230514-001
Japanese	230514-291		

Keyboard with pointing stick (for use only with Evo Notebook N400c models)

Belgian	230515-181	Korean	230515-AD1
Brazilian	230515-201	Latin American Spanish	230515-161
Czech	230515-221	Norwegian	230515-091
Danish	230515-081	Portuguese	230515-131
French	230515-051	Spanish	230515-071
French Canadian	230515-121	Swedish/Finnish	230515-101
German	230515-041	Swiss	230515-111
Hungarian	230515-211	Taiwanese	230515-AB1
International	230515-002	Turkish	230515-141
Italian	230515-061	U.K. English	230515-031
Japanese	230515-291	U.S. English	230515-001

Evo Notebook N400c models only—If you are removing a pointing stick keyboard, you must first remove the palm rest so the pointing stick button cable can be disconnected. Refer to Section 5.5 for palm rest removal instructions.

If you are removing a TouchPad keyboard, it is not necessary to remove the palm rest prior to removing the keyboard.

1. Prepare the notebook for disassembly (Section 5.3).
2. Turn the notebook bottom side up with the front facing forward.
3. Remove the four TM2.0 × 6.0 screws that secure the keyboard to the base enclosure (Figure 5-17).

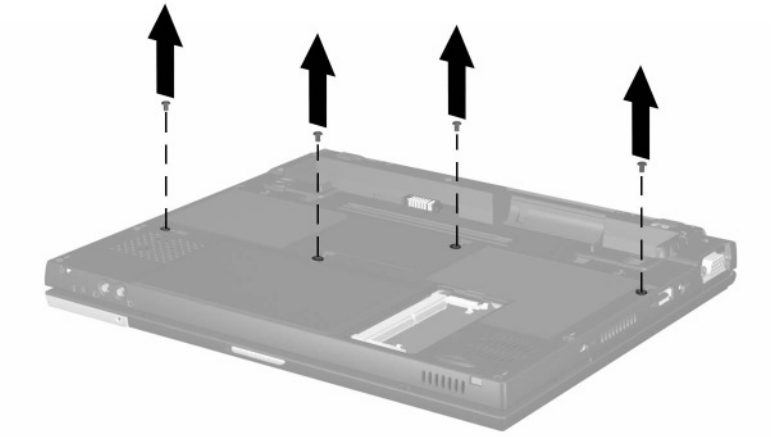


Figure 5-17. Removing the Keyboard Screws

4. Turn the notebook top side up with the front facing forward.
5. Open the notebook.

If you are removing a pointing stick keyboard, make sure the palm rest has been removed and the pointing stick button cable is disconnected before proceeding with the following steps.

6. Lift up the front edge of the keyboard ❶ until it clears the memory expansion connector and the mini PCI connector (Figure 5-18).
7. Slide the keyboard forward until it disengages from the ❷ and rest it on the base enclosure.

Figure 5-18. Releasing the Keyboard

8. Release the ZIF connector ❶ to which the keyboard cable is attached and disconnect the keyboard cable ❷ (Figure 5-19).
9. Remove the keyboard.

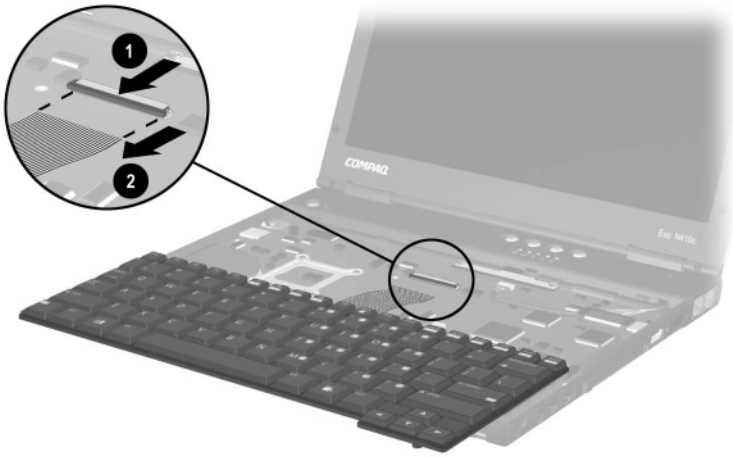


Figure 5-19. Disconnecting the Keyboard Cable

Reverse the above procedure to install the keyboard.

5.10 Real Time Clock (RTC) Battery

The RTC battery is included in the Miscellaneous Plastics Kit (spare part number 231454-001).

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the palm rest (Section 5.5).
3. Remove the keyboard (Section 5.9).
4. Disconnect the RTC battery cable from the system board ❶ (Figure 5-20).
5. Remove the RTC battery ❷.

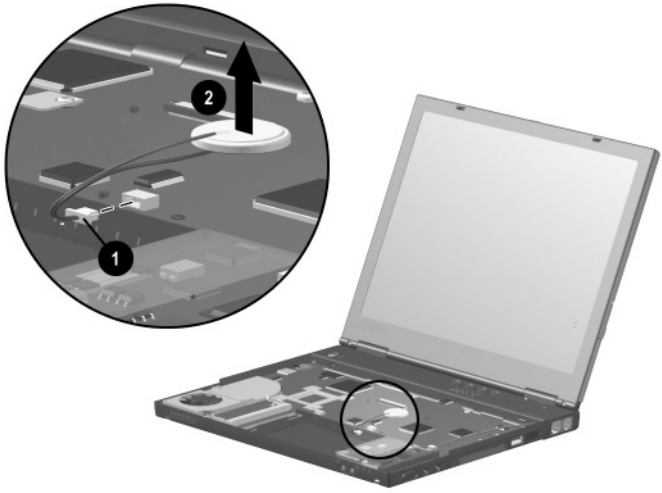


Figure 5-20. Removing the RTC Battery

Reverse the above procedure to install the RTC battery.

5.11 Switch Cover

Switch Cover Spare Part Number Information	
Switch cover	231453-001

1. Prepare the notebook for disassembly (Section 5.3).
2. Remove the palm rest (Section 5.5).
3. Remove the keyboard (Section 5.9).
4. Close the notebook.
5. Turn the notebook bottom side up with the rear panel facing forward.
6. Remove the four TM2.0 × 6.0 screws that secure the switch cover to the base enclosure (Figure 5-21).

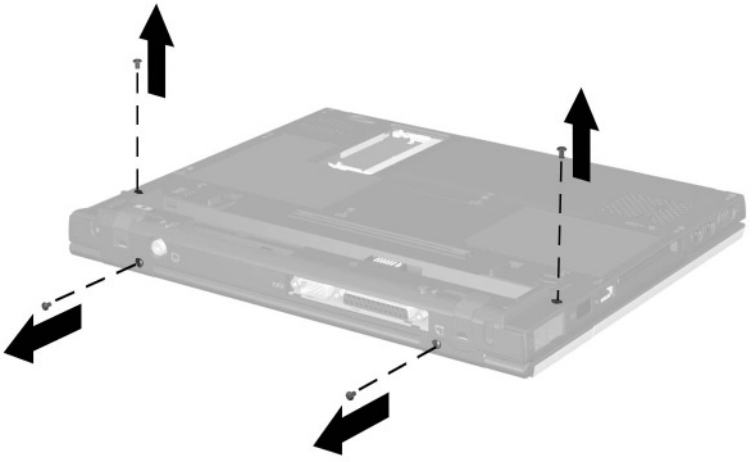


Figure 5-21. Removing the Switch Cover Screws

7. Turn the notebook top side up with the front facing forward.
8. Open the notebook as far as it will open.
9. Lift up on the outside edges of the switch cover to disengage it from the base enclosure ❶ (Figure 5-22).
10. Remove the switch cover ❷.

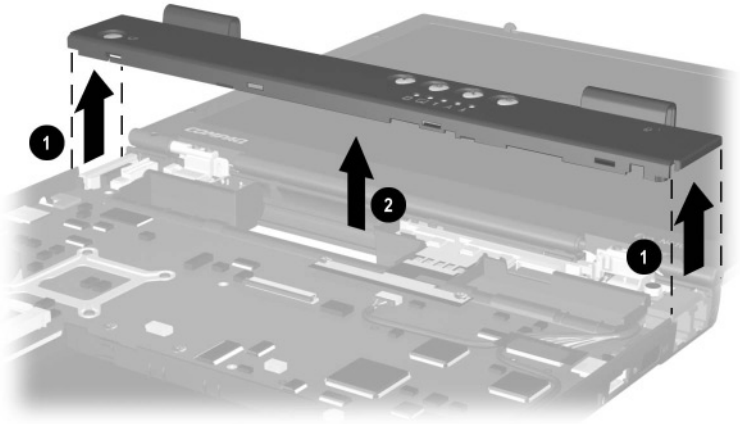


Figure 5-22. Removing the Switch Cover

Reverse the above procedure to install the switch cover.

5.12 Display

Display Spare Part Number Information	
12.1-inch, XGA, CTFT (for use only with Evo Notebook N410c models)	292383-001
12.1-inch, SVGA, CTFT (for use only with Evo Notebook N400c models)	231448-001

1. Prepare the notebook for disassembly (Section 5.3) and, in the order below, remove the following components:
   - ❏ Palm rest (Section 5.5)
   - ❏ Keyboard (Section 5.9)
   - ❏ Switch cover (Section 5.11)

2. Disconnect the display signal ❶ and backlight ❷ cables from the system board (Figure 5-23).

When the display screws are removed, the display assembly is unsupported. Make sure to provide support for the display assembly when removing the display screws.

3. Remove the four TM2.0 × 6.0 screws ❸ that secure the display to the base enclosure.
4. Remove the display.

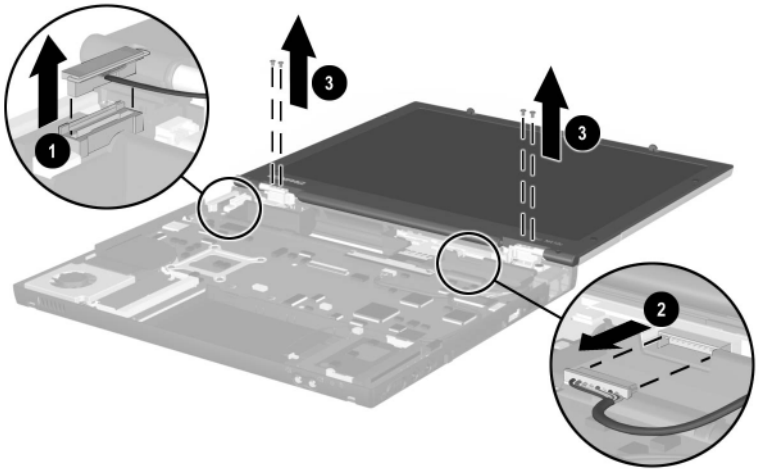


Figure 5-23. Removing the Display

When replacing the display, make sure the display cables are routed as indicated in Figure 5-24. To ensure proper alignment of the display, loosely install the screws in the ❶, ❷, ❸, ❹ sequence indicated. After all four screws have been loosely installed, tighten them.

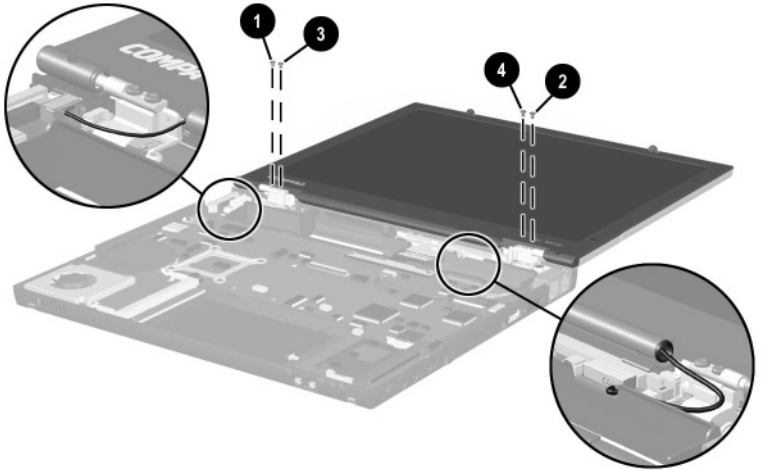


Figure 5-24. Routing the Display Cables and Installing the Display Screws

5.13 Modem Cable

Modem Cable Spare Part Number Information	
For use only with Evo Notebook N410c models (includes RJ45/RJ11 connector module, display lid switch board, microphone, and modem/microphone/NIC cable bundle)	302781-001
For use only with Evo Notebook N400c models (includes display lid switch board, microphone, and microphone cable)	231451-001

1. Prepare the notebook for disassembly (Section 5.3) and, in the order below, remove the following components:
   - ❏ Palm rest (Section 5.5)
   - ❏ Keyboard (Section 5.9)
   - ❏ Switch cover (Section 5.11)
   - ❏ Display (Section 5.12)
2. Position the notebook so the rear panel faces you.

3. Remove the TM2.0 × 6.0 screw ❶ that secures the right display support to the base enclosure (Figure 5-25).
4. Remove the right display support ❷.

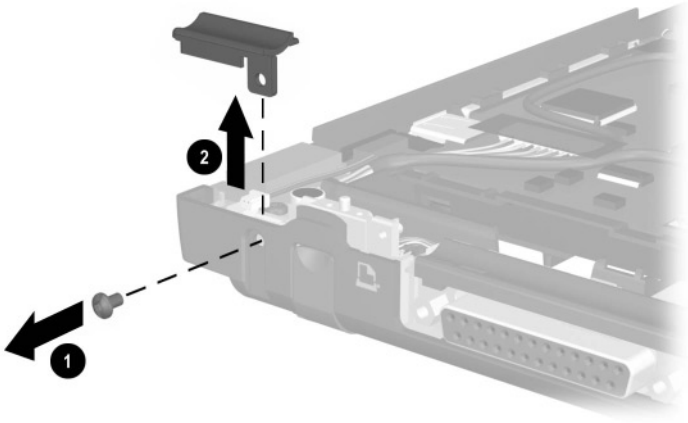


Figure 5-25. Removing the Right Display Support

5. Position the notebook so the front faces you.

Steps 6 through 11 apply only to Evo Notebook N410c models.

6. Lift the RJ45/RJ11 connector module ❶ out of the base enclosure (Figure 5-26).
7. Disconnect the microphone cable ❷ from the connector on the display lid switch board.
8. Disconnect the microphone cable ❸ from the system board.
9. Remove the PM 2.0 × 5.0 screw ❹ that secures the display lid switch board to the base enclosure.

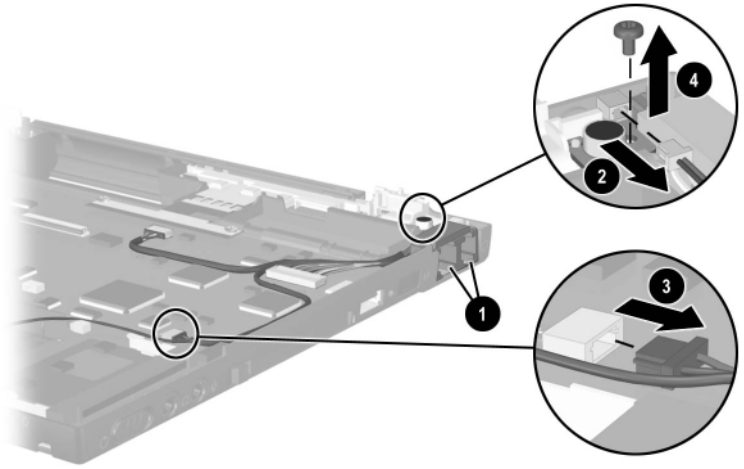


Figure 5-26. Removing the Modem Cable on Evo Notebook N410c Models

10. Disconnect the network interface card (NIC) passthrough cable ❶ and NIC/switch to system cable ❷ from the system board (Figure 5-27).
11. Remove the modem cable.

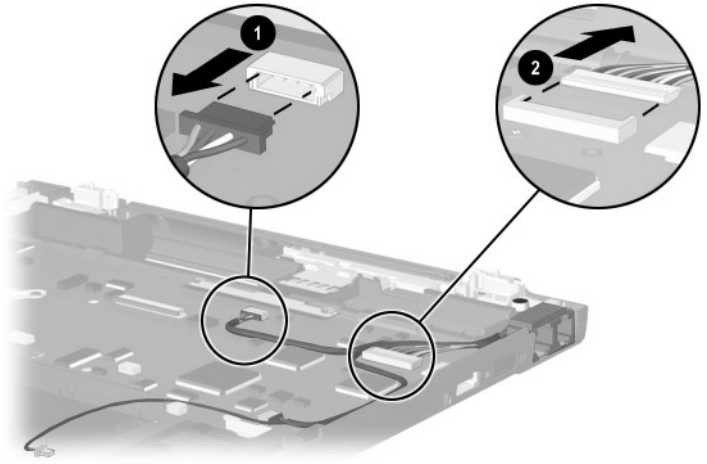


Figure 5-27. Removing the Modem Cable on Evo Notebook N410c Models (continued)

Steps 12 through 16 apply only to Evo Notebook N400c models.

12. Remove the RJ45/RJ11 connector module ❶ from the base enclosure (Figure 5-28).
13. Disconnect the microphone cable ❷ from the display lid switch board.
14. Disconnect the microphone cable ❸ from the system board.
15. Remove the PM2.0 × 4.0 screw ❹ that secures the display lid switch board to the base enclosure.
16. Remove the modem cable.

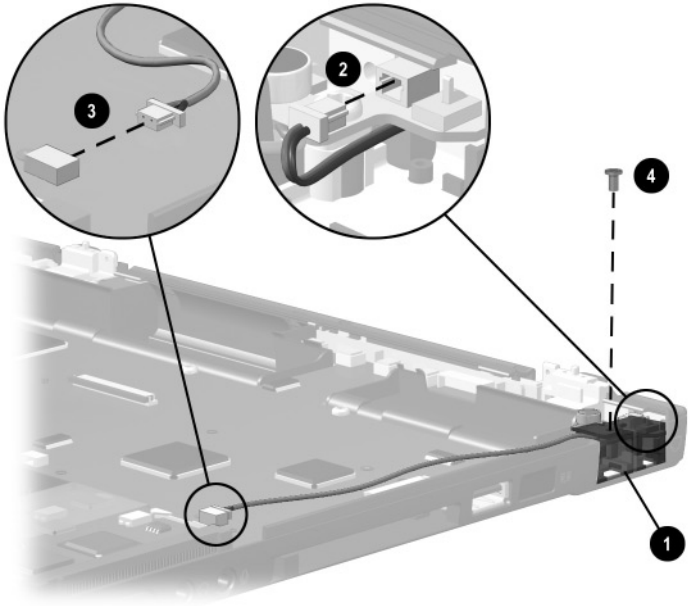


Figure 5-28. Removing the Modem Cable on Evo Notebook N400c Models

Reverse the above procedure to install the modem cable.

5.14 System Board

System Board Spare Part Number Information	
System boards (includes fan and heat sink)	
For use only with Evo Notebook N410c models	
1.20-GHz Intel Pentium III processor	292387-001
1.00-GHz Intel Pentium III processor	292386-001
For use only with Evo Notebook N400c models	
850-MHz Intel Pentium III processor	253104-001
700-MHz Intel Pentium III processor	231446-001

1. Prepare the notebook for disassembly (Section 5.3) and, in the order below, remove the following components:
   - ❏ Palm rest (Section 5.5)
   - ❏ Hard drive (Section 5.7)
   - ❏ Mini PCI communications board (Section 5.8)
   - ❏ Keyboard (Section 5.9)
   - ❏ RTC battery (Section 5.10)
   - ❏ Switch cover (Section 5.11)
   - ❏ Display (Section 5.12)
   - ❏ Modem cable (Section 5.12)

2. Lift the inside edge of the center display support and swing it toward the back of the notebook ❶ (Figure 5-29).
3. Remove the center display support ❷.

The center display support is included in the Miscellaneous Plastics Kit (spare part number 231454-001).

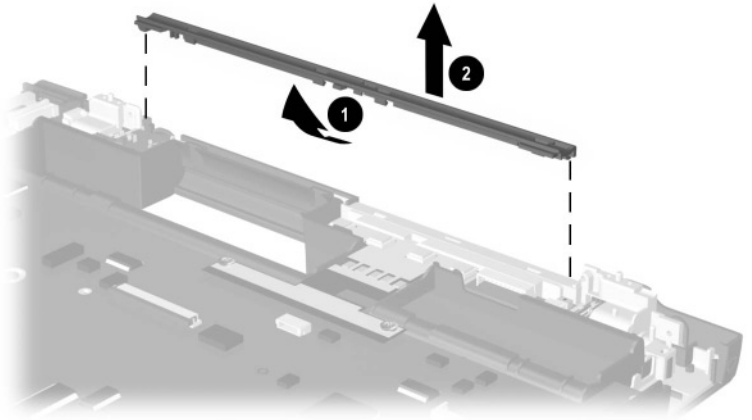


Figure 5-29. Removing the Center Display Support

4. Turn the base enclosure bottom side up with the rear panel facing forward.
5. Remove the PM2.0 × 7.0 barrel screw ❶ that secures the system board to the base enclosure (Figure 5-30).
6. **Evo Notebook N410c models only**—Remove the PM2.0 × 4.0 screw ❷ that secures the system board to the base enclosure.

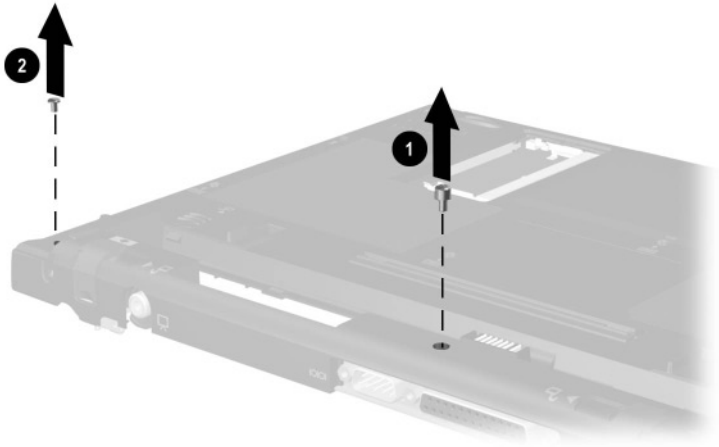


Figure 5-30. Removing the System Board Screw

7. Turn the base enclosure top side up with the rear panel facing forward.
8. Remove the TM2.0 × 6.0 screw ❶ that secures the left display support to the base enclosure (Figure 5-31).

The left display support is included in the Miscellaneous Plastics Kit (spare part number 231454-001).

9. Remove the left display support ❷.
10. Remove the two HM5.0 × 9.0 screwlocks ❸ that secure the external monitor connector to the base enclosure.
11. Remove the six TM2.0 × 4.0 screws ❹ that secure the system board to the base enclosure.

Evo Notebook N410c models have an additional TM2.0 × 3.5 screw ❺ that must be removed.

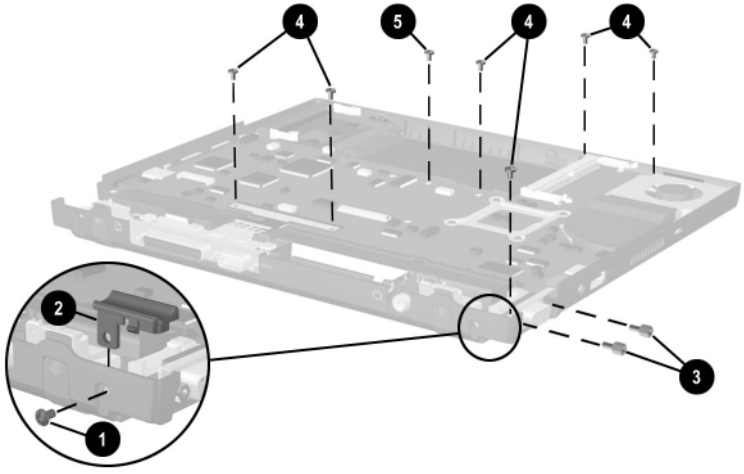


Figure 5-31. Removing the System Board Screws and Screwlocks

Do not remove the screw ❶ on the fan assembly or the four screws that secure the processor mounting bracket ❷ when removing the system board (Figure 5-32).

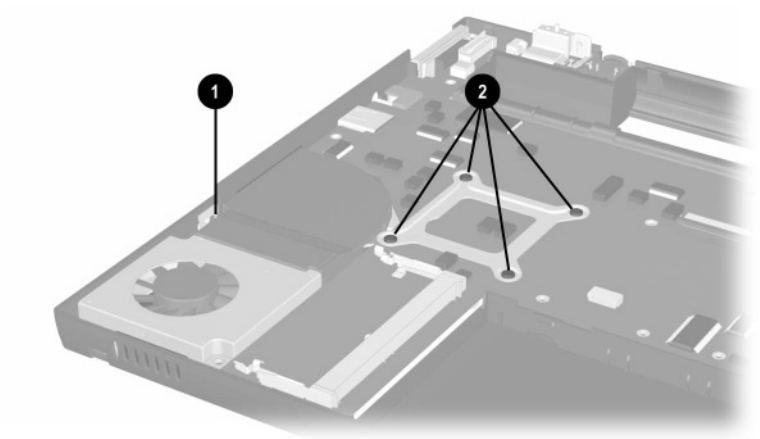


Figure 5-32. Identifying the Processor Mounting Bracket and Fan Screws

12. Disconnect the external battery terminal ❶ and speaker cables ❷ from the system board (Figure 5-33).

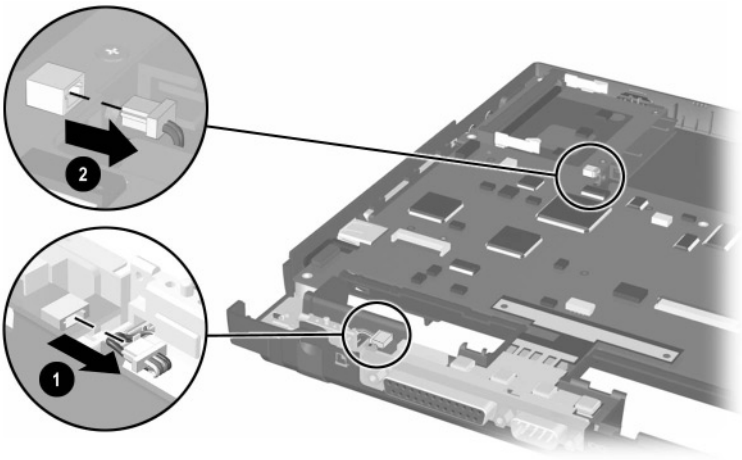


Figure 5-33. Disconnecting the External Battery Terminal and Speaker Cables from the System Board

13. Position the base enclosure so the front faces forward.
14. Use the fan and heat sink assembly to lift up and hold the right side of the system board ❶ until the external battery terminal ❷ and NTSC module cables ❸ clear the base enclosure (Figure 5-34).

CAUTION: When lifting the system board, do not exert any pressure on the external monitor connector. Lifting the system board using the external monitor connector can stress and damage the system board.

15. Disconnect the external battery terminal ❷ and NTSC module cables ❸ from the system board.

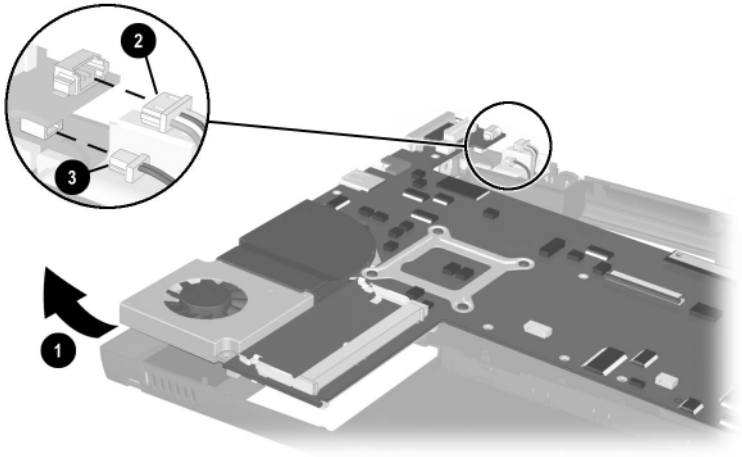


Figure 5-34. Disconnecting the External Battery Terminal and NTSC Module Cables from the System Board

16. Slide the system board to the left to remove it from the base enclosure (Figure 5-35).

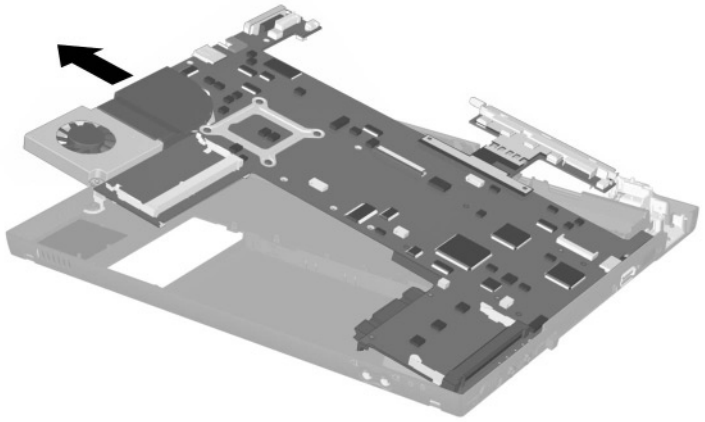


Figure 5-35. Removing the System Board

Reverse the above procedure to install the system board.

When installing the system board into the base enclosure, place the left edge of the system board into the base enclosure first to ensure that the PC Card eject button properly fits into the slot in the base enclosure ❶. Make sure the external monitor connector bracket ❷ and security cable slot bracket ❸ are in their proper locations (Figure 5-36).

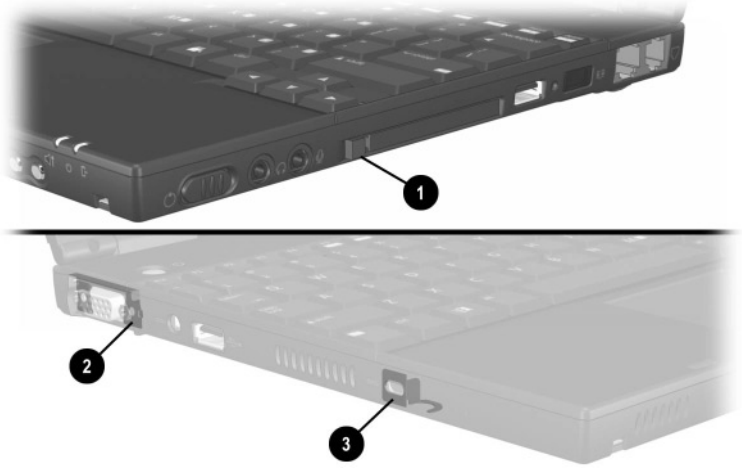


Figure 5-36. Installing the System Board

Make sure the speaker ❶, external battery terminal ❷ and ❸, and NTSC module cables ❹ do not get trapped underneath the system board when it is installed into the base enclosure (Figure 5-37).

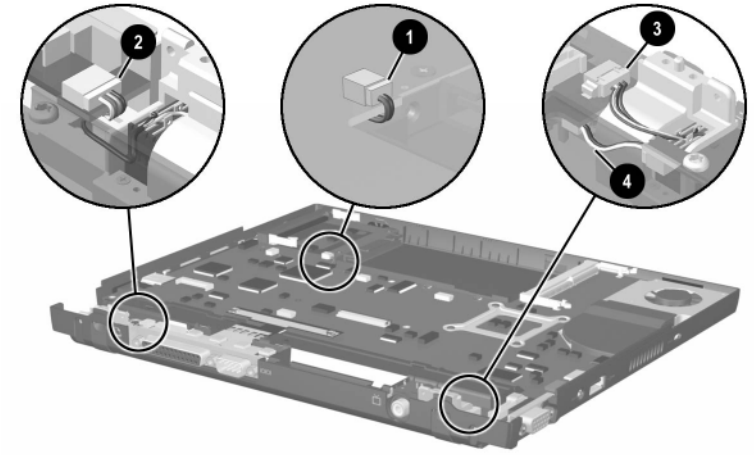


Figure 5-37. Routing the Speaker, External Battery Terminal and NTSC Module Cables

6

Specifications

This chapter provides physical and performance specifications.

Table 6-1
Computer

Dimensions		
Height	2.26 cm	.89 in
Width	26.67 cm	10.5 in
Depth	24.13 cm	9.5 in
Weight	1.59 kg	3.5 lb
Standalone (battery) power requirements		
Nominal operating voltage (Li ion)	14.8 VDC	
Maximum operating power	40 W	
Peak operating power	50 W	
AC adapter power requirements		
Rated input power	90 to 264 VAC RMS (auto switching)	
Rated input current	< 60 W	
Rated frequency	47 to 63 Hz	
Temperature		
Operating	10 to 35° C	50 to 95° F
Nonoperating	-20 to 60° C	-4 to 140° F

Table 6-1
Computer *(Continued)*

Relative humidity		
Operating	10 to 90% relative humidity, non-condensing	
Nonoperating	5 to 90% relative humidity, 101.6° F/38.7° C maximum wet bulb temperature	
Altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	0 to 3,048 m	0 to 10,000 ft
Nonoperating (14.7 to14.4 psia)	0 to 9,144 m	0 to 30,000 ft
Shock		
Operating	10 G, 11 ms, half sine	
Nonoperating	60 G, 11 ms, half sine	
Vibration		
Operating	0.5 G, 10 to 500 Hz, 0.5 oct/min sweep rate	
Nonoperating	1.0 G, 10 to 500 Hz, 0.50 oct/min sweep rate	

Applicable product safety standards specify thermal limits for plastic surfaces. The notebook operates well within this range of temperatures.

Table 6-2
12.1-inch XGA, TFT Display

Dimensions		
Height	21.16 cm	10.3 in
Width	19.81 cm	7.8 in
Diagonal	30.73 cm	12.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	125:1	
Brightness	130 nits typical on AC power, 70 nits typical on battery power, 115 nits minimum	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	1024 × 768	
Configuration	RGB vertical stripe	
Backlight	Cold cathode fluorescent, 1 tube	
Character display	80 × 25	
Refresh rate	60 Hz	
Total power consumption	4 W	

Table 6-3
12.1-inch SVGA, TFT Display

Dimensions		
Height	21.16 cm	10.3 in
Width	19.81 cm	7.8 in
Diagonal	30.73 cm	12.1 in
Number of colors	Up to 16.8 million	
Contrast ratio	125:1	
Brightness	130 nits typical on AC power, 70 nits typical on battery power, 115 nits minimum	
Pixel resolution		
Pitch	0.264 × 0.264 mm	
Format	800 × 600	
Configuration	RGB vertical stripe	
Backlight	Cold cathode fluorescent, 1 tube	
Character display	80 × 25	
Refresh rate	60 Hz	
Total power consumption	4 W	

Table 6-4
Hard Drives

	40 GB	30 GB	20 GB	10 GB
User capacity per drive[1]	40.0 GB	30.0 GB	20.0 GB	10.0 GB
Drive height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Drive width	70 mm	70 mm	70 mm	70 mm
Interface type	ATA-5	ATA-5	ATA-5	ATA-4
Seek times (typical read, including setting)				
Single track	3 ms	3 ms	3 ms	2.5 ms
Average	13 ms	13 ms	13 ms	12 ms
Full stroke	24 ms	24 ms	24 ms	23 ms
Logical blocks[3]	78,140,160	58,605,120	39,070,080	19,640,880
Logical configuration				
Cylinders	16,683	16,683	16,683	16,683
Heads	16	16	16	16
Sectors per track	63	63	63	63

[1] 1 GB = 1,073,741,824 bytes.

[3] Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-4
Hard Drives *(Continued)*

	40 GB	30 GB	20 GB	20 GB
Physical configuration				
Cylinders[3]	22,784	25,800	22,784	22,784
Heads	4	2	4	2
Sectors per track[3]	293 to 560	398 to 731	293 to 560	293–560
Bytes per sector	512	512	512	512
Buffer size[3]	2 MB	512 KB	512 KB	512 KB
Disk rotational speed	4200 rpm	4200 rpm	4200 rpm	4200 rpm
Transfer rate				
Interface max (MB/s)[2]	66.6	100	66.6	66.6
Media (Mb/s)[3]	109 to 203	155 to 256	109 to 203	109 to 203

[2] System capability may differ.

[3] Actual drive specifications may differ slightly.

Certain restrictions and exclusions apply. Consult the Compaq Customer Support Center for details.

Table 6-5
Diskette Drive

Diskette size	8.89 cm	3.5 in
Light	On system	
Height	1.27 cm	.05 in
Bytes per sector	512	
Sectors per track		
High density	18 (1.44 MB)	15 (1.2 MB)
Low density	9	
Tracks per side		
High density	80	
Low density	80	
Read/write heads	2	
Average seek times		
Track-to-track (high/low)	3 ms	6 ms
Average (high/low)	95 ms	174 ms
Settling time	15 ms	
Latency average	100 ms	

Table 6-6
CD-ROM Drive

Applicable disk	CD-ROM (Mode 1, 2, and 3) CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Extra Video CD CD-WO (fixed packets only) CD-Bridge
Center hole diameter	1.50 cm .59 in
Disk diameter	12 cm, 8 cm
Disk thickness	1.20 mm
Track pitch	1.6 µ
Access time	
Random	< 150 ms
Full Stroke	< 300 ms
Cache buffer	128 KB
Data transfer rate	
Sustained, 24X	2400 KB/sec (150 KB/sec at 1X)
Variable	1500 to 3600 KB/sec (10X to 24X)
Normal PIO Mode 4 (single burst)	16.66 KB/sec
Startup time	< 8 seconds
Stop time	< 4 seconds

Table 6-7
DVD-ROM Drive

Applicable disk	DVD-5, DVD-9, DVD-10 CD-ROM (Mode 1 and 2) CD Digital Audio CD-XA ready (Mode 2, Form 1 and 2) CD-I ready (Mode 2, Form 1 and 2) CD-R (read only) CD Plus Photo CD (single/multisession) CD-Bridge
Center hole diameter	1.50 cm .59 in
Disk diameter	12 cm, 8 cm
Disk thickness	1.20 mm
Track pitch	.74 µ
Access time	
Random	< 150 ms
Full Stroke	< 225 ms
Audio output level	
Lineout	0.7 V rms
Headphone	None
Cache buffer	128 KB
Data transfer rate	
Sustained, 1X DVD rate	150 KB/sec
Sustained, 16X DVD rate	2400 KB/sec
Sustained, 1X DVD rate	1380 KB/sec
Sustained, 4X DVD rate	5520 KB/sec
Normal IO Mode 4 (single burst)	16.6 MB/sec
Startup time	< 15 seconds
Stop time	< 6 seconds

Table 6-8
Battery Packs

Dimensions		
Primary Lithium ion (Li ion)		
Height	1.98 cm	.78 in
Width	23.01 cm	9.06 in
Depth	4.67 cm	1.84
Weight	.22 kg	.49 lb
Cells	4	
External Li ion		
Height	2.29 cm	.90 in
Width	26.59 cm	10.47 in
Depth	2.29 cm	.9 in
Weight	.22 kg	.48 lb
Cells	4	
External Li ion High Capacity		
Height	4.60 cm	1.81 in
Width	26.90 cm	10.59 in
Depth	3.00 cm	1.18 in
Weight	.42 kg	.93 lb
Cells	4	
Energy		
Primary and External Li ion		
Voltage	14.4 V	
Amp-hour capacity	1.96 Ah	
Watt-hour capacity	28 Wh	
External Li ion High Capacity		
Voltage	14.4 V	
Amp-hour capacity	2.87 Ah	
Watt-hour capacity	349 Wh	
Environmental requirements		
Temperature		
Operating	5°C to 35° C	41°F to 95° F
Nonoperating	-20°C to 60° C	-4°F to 140° F

Table 6-9
AC Adapter

Weight	.18 kg	0.39 lb
Power supply (input)		
Operating voltage	90 to 260 VAC RMS Nominal	
Operating current	1.3 A RMS	
Operating frequency range	47 to 63 Hz Nominal	
Maximum transient	4/50 kV	

Table 6-10
System DMA

Hardware DMA	System Function
DMA0	Available for audio
DMA1	Entertainment audio (default; alternate = DMA0, DMA3, none)
DMA2	Diskette drive
DMA3	ECP parallel port LPT1 (default; alternate = DMA0, none)
DMA4	DMA controller cascading (not available)
DMA5	Available for PC Card
DMA6	Not assigned
DMA7	Not assigned
PC Card controller can use DMA 1, 2, or 5.	

Table 6-11
System Interrupts

Hardware IRQ	System Function
IRQ0	System timer
IRQ1	Keyboard controller
IRQ2	Cascaded
IRQ3	COM2
IRQ4	COM1
IRQ5	Audio (default)*
IRQ6	Diskette drive
IRQ7	Parallel port
IRQ8	Real time clock (RTC)
IRQ9	Infrared
IRQ10	System use
IRQ11	System use
IRQ12	Internal point stick or external mouse
IRQ13	Coprocessor (not available to any peripheral)
IRQ14	IDE interface (hard drive and optical drive)
IRQ15	System use

PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

Table 6-12
System I/O Addresses

I/O Address (hex)	**System Function** (shipping configuration)
000 - 00F	DMA controller no. 1
010 - 01F	Unused
020 - 021	Interrupt controller no. 1
022 - 024	Opti chipset configuration registers
025 - 03F	Unused
02E - 02F	87334 “Super IO” configuration for CPU
040 - 05F	Counter/timer registers
044 - 05F	Unused
060	Keyboard controller
061	Port B
062 - 063	Unused
064	Keyboard controller
065 - 06F	Unused
070 - 071	NMI enable/real time clock
072 - 07F	Unused
080 - 08F	DMA page registers
090 - 091	Unused
092	Port A
093 - 09F	Unused
0A0 - 0A1	Interrupt controller no. 2

Table 6-12
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
0A2 - 0BF	Unused
0C0 - 0DF	DMA controller no. 2
0E0 - 0EF	Unused
0F0 - 0F1	Coprocessor busy clear/reset
0F2 - 0FF	Unused
100 - 16F	Unused
170 - 177	Secondary fixed disk controller
178 - 1EF	Unused
1F0 - 1F7	Primary fixed disk controller
1F8 - 200	Unused
201	Joystick (decoded in ESS1688)
202 - 21F	Unused
220 - 22F	Entertainment audio
230 - 26D	Unused
26E - 26	Unused
278 - 27F	Unused
280 - 2AB	Unused
2A0 - 2A7	Unused
2A8 - 2E7	Unused
2E8 - 2EF	Reserved serial port

Table 6-12
System I/O Addresses *(Continued)*

I/O Address (hex)	**System Function** (shipping configuration)
2F0 - 2F7	Unused
2F8 - 2FF	Infrared port
300 - 31F	Unused
320 - 36F	Unused
370 - 377	Secondary diskette drive controller
378 - 37F	Parallel port (LPT1/default)
380 - 387	Unused
388 - 38B	FM synthesizer - OPL3
38C - 3AF	Unused
3B0 - 3BB	VGA
3BC - 3BF	Reserved (parallel port/no EPP support)
3C0 - 3DF	VGA
3E0 - 3E1	PC Card controller in CPU
3E2 - 3E3	Unused
3E8 - 3EF	Internal modem
3F0 - 3F7	“A” diskette controller
3F8 - 3FF	Serial port (COM1/default)
CF8 - CFB	PCI configuration index register (PCIDIVO-1)
CFC - CFF	PCI configuration data register (PCIDIVO-1)

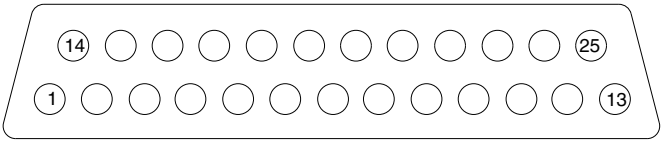
Table 6-13
System Memory Map

Size	Memory Address	System Function
640 K	00000000 - 0009FFFF	Base memory
128 K	000A0000 - 000BFFFF	Video memory
48 K	000C0000 - 000CBFFF	Video BIOS
160 K	000C8000 - 000E7FFF	Unused
64 K	000E8000 - 000FFFFF	System BIOS
15 M	00100000 - 00FFFFFF	Extended memory
58 M	01000000 - 047FFFFF	Super extended memory
58 M	04800000 - 07FFFFFF	Unused
2 M	08000000 - 080FFFFF	Video memory (direct access)
4 G	08200000 - FFFEFFFF	Unused
64 K	FFFF0000 - FFFFFFFF	System BIOS

A

Connector Pin Assignments

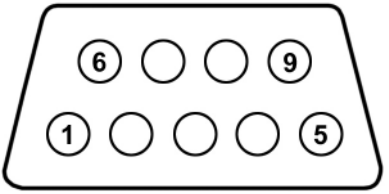
Table A-1
Parallel



Pin	Signal	Pin	Signal
1	Strobe*	10	Acknowledge*
2	Data bit 0	11	Busy
3	Data bit 1	12	Paper out
4	Data bit 2	13	Select
5	Data bit 3	14	Auto line feed*
6	Data bit 4	15	Error*
7	Data bit 5	16	Initialize printer*
8	Data bit 6	17	Select in*
9	Data bit 7	18-25	Signal ground

*Signal is active low.

Table A-2
Serial



Pin	Signal	Pin	Signal
1	Carrier detect	6	Data set ready
2	Receive data	7	Ready to send
3	Transmit data	8	Clear to send
4	Data terminal ready	9	Ring indicator
5	Signal ground		

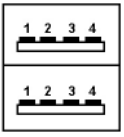
Table A-3
Stereo Speaker/Headphone

Pin	Signal	Pin	Signal
1	Audio out	2	Ground

Table A-4
Microphone

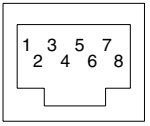
Pin	Signal	Pin	Signal
1	Audio in	2	Ground

Table A-5
Universal Serial Bus



Pin	Signal	Pin	Signal
1	+5 VDC	3	Data +
2	Data -	4	Ground

Table A-6
RJ-45 Network Interface

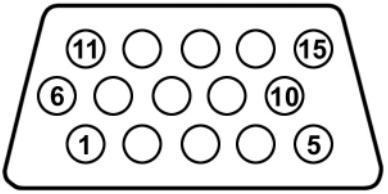


Pin	Signal	Pin	Signal
1	Transmit +	5	Unused
2	Transmit -	6	Receive -
3	Receive +	7	Unused
4	Unused	8	Unused

Table A-7
RJ-11 Modem

Pin	Signal	Pin	Signal
1	Unused	4	Unused
2	Tip	5	Unused
3	Ring	6	Unused

Table A-8
External Monitor



Pin	Signal	Pin	Signal
1	Red analog	9	+5 VDC
2	Green analog	10	Ground
3	Blue analog	11	Monitor detect
4	Not connected	12	DDC 2B data
5	Ground	13	Horizontal sync
6	Ground analog	14	Vertical sync
7	Ground analog	15	DDC2B clock
8	Ground analog		

B

Power Cord Set Requirements

3-Conductor Power Cord Set

The wide range input feature of the notebook permits it to operate from any line voltage from 100 to 120 or 220 to 240 volts AC.

The power cord set received with the notebook meets the requirements for use in the country where the equipment is purchased.

Power cord sets for use in other countries must meet the requirements of the country where the notebook is used. For more information on power cord set requirements, contact a Compaq authorized reseller or service provider.

General Requirements

The requirements listed below are applicable to all countries:

- The length of the power cord set must be at least 1.5 m (5.00 feet) and no more than 2.0 m (6.50 feet).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country where the power cord set will be used.
- The power cord set must have a minimum current capacity of 10 amperes and a nominal voltage rating of 125 or 250 volts AC, as required by each country's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector, for mating with the appliance inlet on the back of the notebook.

Country-Specific Requirements

3-Conductor Power Cord Set Requirements

Country	Accredited Agency	Applicable Note Number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
Sweden	SEMKO	1
Switzerland	SEV	1

3-Conductor Power Cord Set Requirements *(Continued)*

Country	Accredited Agency	Applicable Note Number
United Kingdom	BSI	1
United States	UL	2

Notes

1. The flexible cord must be <HAR> Type HO5VV-F, 3-conductor, 1.0 mm^2 conductor size. The power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country where they will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

C

Screw Listing

This appendix provides specification information for the screws used in the notebook. All screws listed in this appendix are available in the Miscellaneous Screw Kit, spare part number 231455-001.

Table C-1
Phillips P0 Metric 2.0 × 3.0 Screw

	Color	Qty	Length	Thread	Head Width
	Silver	1	3.0 mm	2.0 mm	3.0 mm

Where used:

One screw that secures the MultiPort cover to the display assembly (refer to the documentation included with the MultiPort device for information on removing the MultiPort cover)

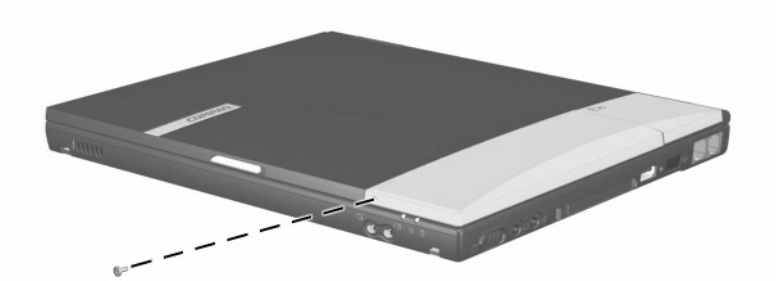


Figure C-1. TM2.0 × 3.0 Screw Location

Table C-2
Torx T8 Metric 2.0 × 6.0 Screw

	Color	Qty	Length	Thread	Head Width
	Black	19	6.0 mm	2.0 mm	4.0 mm

Where used:

❶ Four screws that secure the palm rest to the base enclosure (documented in Section 5.5)

❷ One screw that secures the memory expansion compartment cover to the base enclosure (documented in Section 5.6)

❸ Four screws that secure the keyboard to the base enclosure (documented in Section 5.9)

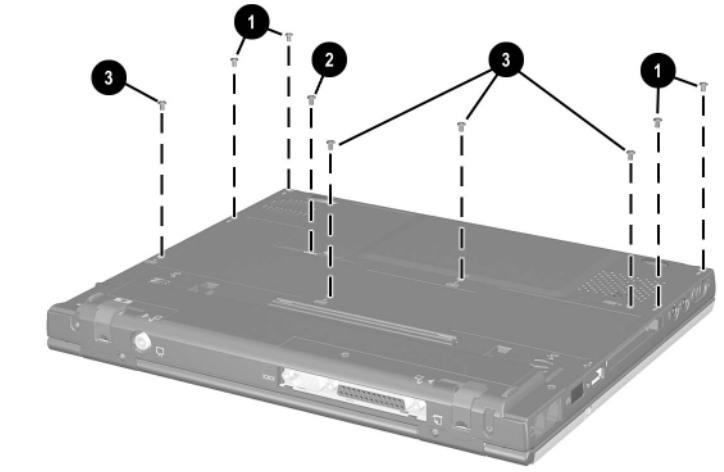


Figure C-2. TM2.0 × 6.0 Screw Locations

Table C-2
Torx T8 Metric 2.0 × 6.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Black	19	6.0 mm	2.0 mm	4.0 mm

Where used:

❶ Four screws that secure the switch cover to the base enclosure (documented in Section 5.11)

❷ One screw that secures the right display support to the base enclosure (documented in Section 5.13)

❸ One screw that secures the left display support to the base enclosure (documented in Section 5.14)

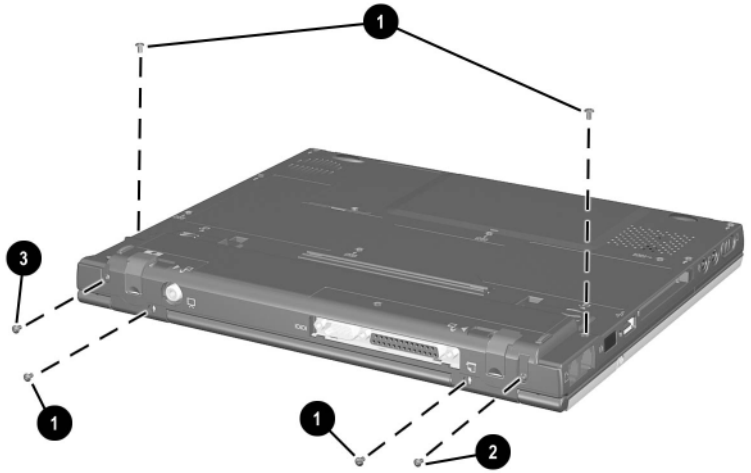


Figure C-3. TM2.0 × 6.0 Screw Locations

Table C-2
Torx T8 Metric 2.0 × 6.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Black	19	6.0 mm	2.0 mm	4.0 mm

Where used:

Four screws that secure the display to the base enclosure (documented in Section 5.12)

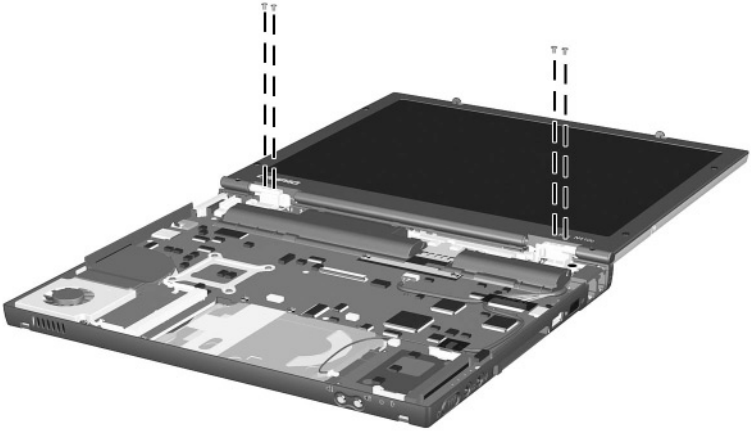


Figure C-4. TM2.0 × 6.0 Screw Locations

Table C-3
Phillips P0 Metric 2.0 × 5.0 Screw

	Color	Qty	Length	Thread	Head Width
	Black	1	5.0 mm	2.0 mm	3.0 mm

Where used:

Evo Notebook N410c models only—One screw that secures the display lid switch board to the system board (documented in Section 5.13)

Figure C-5. TM2.0 × 6.0 Screw Location

Table C-4
Phillips P0 Metric 2.0 × 4.0 Screw

	Color	Qty	Length	Thread	Head Width
	Black	1	4.0 mm	2.0 mm	3.0 mm

Where used:

Evo Notebook N400c models only—One screw that secures the display lid switch board to the system board (documented in Section 5.13)

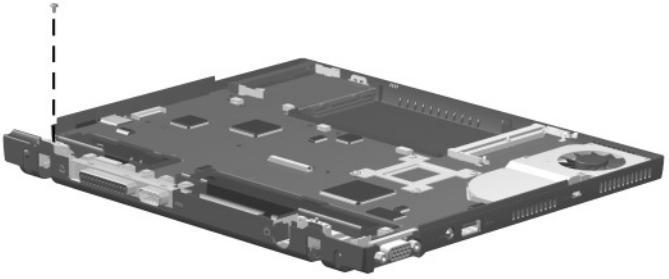


Figure C-6. TM2.0 × 4.0 Screw Location

Table C-4
Phillips P0 Metric 2.0 × 4.0 Screw *(Continued)*

	Color	Qty	Length	Thread	Head Width
	Silver	1	4.0 mm	2.0 mm	3.0 mm

Where used:

Evo Notebook N410c models only—One screw that secures the system board to the system board (documented in Section 5.14)

Figure C-7. TM2.0 × 4.0 Screw Location

Table C-5
Phillips P0 Metric 2.0 × 7.0 Barrel Screw

	Color	Qty	Length	Thread	Head Width
	Silver	1	7.0 mm	2.0 mm	5.0 mm

Where used:

One screw that secures the system board to the base enclosure (documented in Section 5.14)

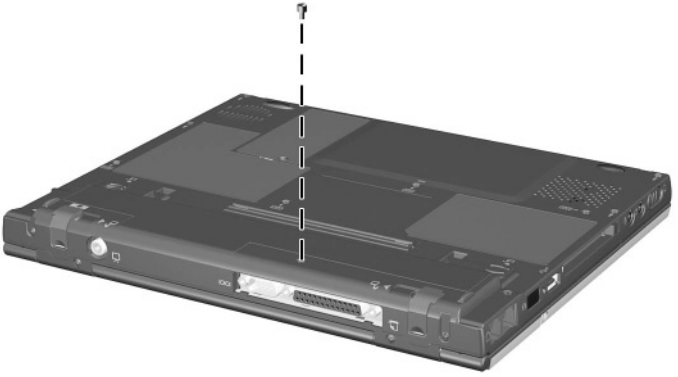


Figure C-8. PM2.0 × 7.0 Barrel Screw Location

Table C-5
Torx T8 Metric 2.0 × 4.0 Screw

	Color	Qty	Length	Thread	Head Width
	Silver	7	4.0 mm	2.0 mm	4.0 mm

Where used:

❶ and ❷ **Evo Notebook N410c models**—Seven screws that secure the system board to the base enclosure (documented in Section 5.14)

❶ **Evo Notebook N400c models**—Six screws that secure the system board to the base enclosure (documented in Section 5.14)

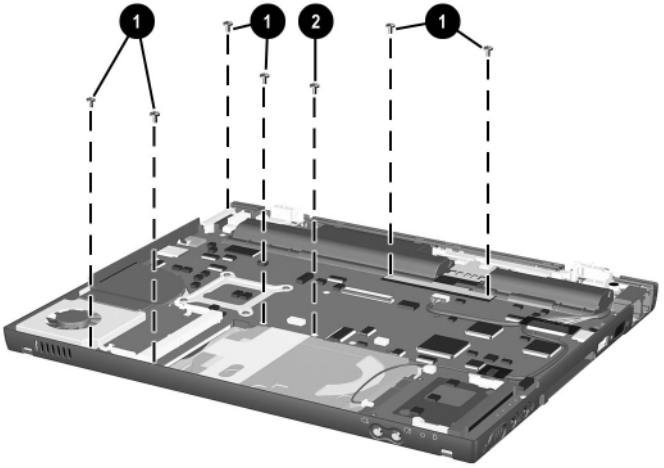


Figure C-9. TM2.0 × 4.0 Screw Locations

Table C-6
5.0 mm × 9.5 Screwlock

Color	Qty	Length	Thread	Head Width
Silver	2	9.5 mm	n/a	5.0 mm

Where used:

Two screwlocks that secure the system board to the base enclosure on each side of the external monitor connector (documented in Section 5.14)

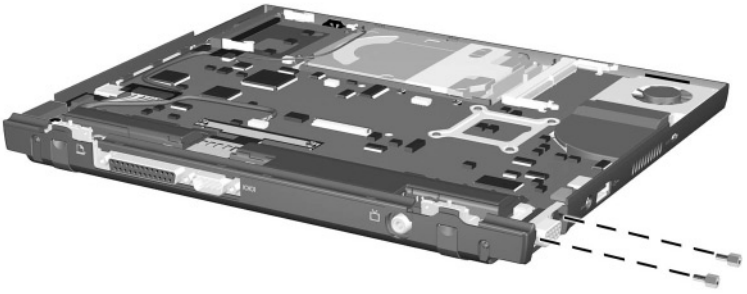


Figure C-10. HM5.0 × 9.5 Screwlock Locations

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